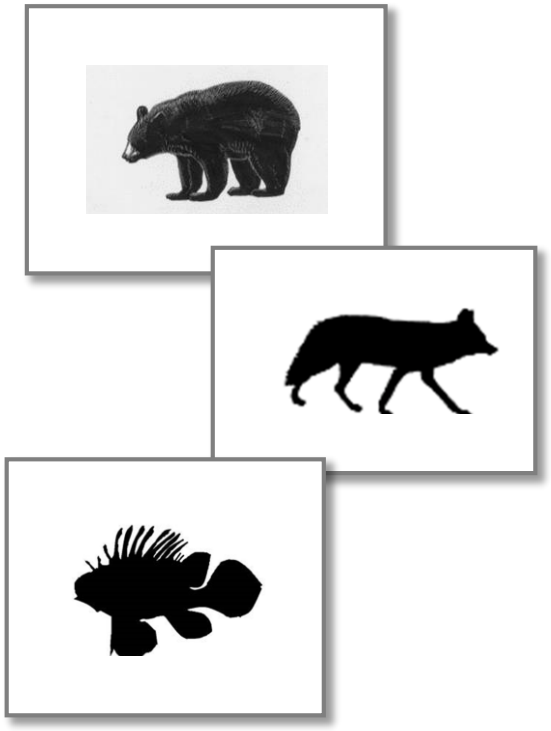
COMMUNICATION ABOUT CONFLICT SPECIES IN FLORIDA:

INSIGHTS FROM MESSAGE-TESTING RESEARCH ABOUT COYOTE, BLACK BEAR, AND LIONFISH



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EXECUTIVE SUMMARY

The Wildlife Assistance Program, within the Division of Habitat and Species Conservation in the Florida Fish and Wildlife Conservation Commission (FWC), strives to promote coexistence with fish and wildlife through communications that help Floridians understand and avoid, minimize, or mitigate negative interactions that create human-wildlife conflict.

FWC sponsored this research by the Human Dimensions Research Unit (HDRU) at Cornell University to increase understanding of current messages being communicated about three native or naturalized species groups (i.e., black bear, coyote, bats) and three nonnative or invasive species groups (i.e., lionfish, Argentine black and white tegu, monkeys) that are frequent subjects of human-wildlife conflict in Florida. FWC sponsored this project to fill information gaps and provide guidance for communication efforts related to these species. The study had two objectives:

1. Document key messages about wildlife conflict species that are being communicated to Floridians, through newspaper articles and FWC print and electronic media.

2. Inform development of FWC communications about wildlife conflict species that helps Floridians avoid and/or manage negative interactions.

Study objectives were satisfied by completing two research tasks. In this document, we report findings from Study Task II, which was designed to test messages about three conflict species (coyote, black bear, lionfish) with panels of Florida residents.

METHODS

Based on findings from Study Task I, the FWC contact team for this project directed us to focus Task II on three of the focal species (i.e., coyote, black bear, and lionfish) and two FWC communication concerns (i.e., [1] motivating problem-prevention behaviors related to coyote or black bear and [2] increasing problem recognition related to the lionfish invasion in Florida).

Message framing was the key concept underlying our study design. Message frames help individuals organize and interpret new information. Communication theorists posit that message framing is a process of selecting information to promote a particular understanding or interpretation of unfolding events, such as problem interactions with wildlife. Message frames are assumed to hold potential to impact attitudes and behavioral intentions, which is of keen interest in communication about reducing or avoiding human-wildlife conflict.

The primary goal of our message-testing experiments was to discover effective messages that can motivate Floridians to adopt problem-prevention or mitigation behaviors regarding human-wildlife interaction. Numerous theories and models are pertinent to message effects. However, it is not possible to apply all those theoretical concepts to message-testing studies within a limited amount of time and resources. Given the context for communicating about conflict species and literature on effectiveness of using various framing approaches we decided to test six frames (i.e., gain/loss frame, self/other-referencing, and individual/collective exemplar) for black bear and coyote messages, and two frames (i.e., ecological./economic) for lionfish messages. The frame types are summarized below. These approaches are rooted in

understanding of accepted behavior change and information processing theories and can easily be incorporated into message design.

Gain/loss frame – Gain frames focused on the advantages of adopting a recommended behavior (e.g., property will be safer if food is unavailable to bears). Loss frames focused on the disadvantages of failing to perform a recommended behavior (e.g., property will be less safe if bears are not prevented from accessing trash containers).

Self/other referencing –Self-referencing messages focused on the consequences that taking an action would have for oneself, one's family, and one's pets. Other-referencing messages focused on the consequences for others (i.e., consequences for one's community, or in the case of bear food-conditioning messages, consequences for bears).

Individual exemplar/collective exemplar–An exemplar is a short story where the experiences of a real or fictitious person(s) are described to illustrate a condition or general phenomenon. Individual exemplars focus on the experiences of a single person (e.g., Bob Smith, local lobster fisherman). Collective exemplars focus on the experiences of a group of people (e.g., commercial fishermen in Florida). Hypothetical exemplars were used in the coyote/pet-safety and lionfish message experiments.

Ecological/economic consequences–Ecological frames focused on the consequences of the lionfish invasion for marine ecosystems in Florida. Economic frames focused on the consequences of the lionfish invasion for Florida's economy. Separate messages were developed to test general and specific ecological and economic frames.

We created a total of eighteen message variations (six message variations for black bear food conditioning, and four message variations each for coyote food conditioning, coyote/pet safety, and lionfish impacts). The content of these messages was based on message framing and effects literature as well as content from newspaper articles and FWC documents that were coded in Task 1.

Objectives for message-testing experiments

- Coyote food conditioning experiments: Test the effectiveness of four message frames in promoting intentions to take actions that prevent coyote food conditioning (associating humans with food sources).

- Black bear food conditioning experiments: Test the effectiveness of six message frames in promoting intentions to take actions that prevent black bear food conditioning.

- Coyote/pet safety experiment: Test the effectiveness of four message frames in promoting intentions to take actions that reduce risks coyotes pose to cats.

- Lionfish issue awareness experiment: Test the effectiveness of four message frames in promoting awareness and perceived importance of the lionfish invasion in Florida.

Survey implementations and analysis

We pretested all message variations using Amazon's Mechanical Turk, an online crowdsourcing service that connects researchers to willing participants for electronic survey instruments. The purpose of the pretest was to verify that participants could identify and understand the predominant frame used in each message. Based on the results of the pretest, two of the messages (bear and coyote food conditioning) were revised and pretested a second time.

We developed survey instruments for each experiment. All instruments contained items to assess a set of behavioral intentions, risk perceptions, emotional responses, attitudes toward taking problem-prevention behaviors, beliefs about the referent species, message-evaluation checks, and demographic traits. For each of the experiments, a control group answered the questionnaire without receiving any message.

We formatted the survey instruments for use online and subcontracted with a highly-regarded service provider (Qualtrics) to implement the surveys. Participants were recruited through the Qualtrics panel service. We provided Qualtrics with our target demographics and electronic links to survey instruments. Qualtrics staff distributed survey links to participants, collected responses, and provided data from completed questionnaires to HDRU for analysis after they reached the completion quotas we had set for each survey. We set the completion quotas based on study objectives, contract specifications, and budget limitations. For the black bear and coyote food conditioning experiments, we identified completion quotas to obtain a relatively even split of rural and urban Floridian residents. All four surveys were implemented during Fall, 2014.

We used IBM SPSS Statistics 21.0 software to calculate frequencies and measures of central tendency (e.g., mean). We used chi-square tests and one-, two-, and three-way analysis of variance (ANOVA) to test for significant differences between treatment groups. All statistical differences are reported at the $P < 0.05$ level. We used ordinary least-squares regression to identify relationships between moderating variables and behavioral intentions.

KEY FINDINGS AND CONCLUSIONS

Coyote food conditioning: Respondents exposed to any of four messages (i.e., family-gain, community-gain, family-loss, community-loss) exhibited higher intentions to take seven key problem-prevention behaviors than respondents in the control group. Thus, all four seem to hold promise as frames for FWC messages to promote those problem-prevention behaviors. Results suggest that family-gain frames may be particularly effective to stimulate problem prevention actions among some audiences (e.g., those who have seen a coyote in the wild, residents of rural counties).

Black bear food conditioning*:* Respondents exposed to any of six messages (i.e., family-gain, community-gain, family-loss, community-loss, bear-gain, bear-loss) exhibited higher intentions to take seven problem-prevention actions than respondents in the control group. Thus, all six seem to hold promise as frames for FWC messages to promote those problem-prevention behaviors. Results suggest that loss-frame messages will resonate with many people, but also

may elevate bear-related fear and perceived risk from bears. Gain frames offer comparable persuasive power without elevating risk perceptions.

Coyote/pet safety: Respondents exposed to any of four messages (i.e., individual or community-gain, individual or community-loss) exhibited higher intentions to seek out or share information about coyotes and pet safety actions than respondents in the control group. Thus, all four seem to hold promise as frames for FWC messages to promote those problem-prevention behaviors. Several findings suggested that individual exemplars may be helpful in encouraging information-seeking and information sharing behaviors, but also may elevate risk perceptions and fear.

Lionfish invasion awareness: Respondents exposed to any of the four messages (i.e., general or specific economic, general or specific ecological) were more likely than the control group to agree that the lionfish issue is important, of personal interest, and necessary to address. All of the messages elevated concern about marine ecosystems and intentions to become engaged in the issue. These results suggest that all four of the tested approaches hold promise as frames for FWC messages to promote recognition of the lionfish invasion as an important public issue.

ACKNOWLEDGMENTS

We thank the many staff members of the Florida Fish and Wildlife Conservation Commission (FWC) who contributed to Task 2 of this research. For their guidance throughout all phases of this work, we extend special thanks to our FWC Contact Team members: Alexander Gulde (Team Leader), Ann Forstchen, Angeline Scotten, and Chris Wynn. Many other FWC staff members contributed during various phases of this research. For their assistance, we express our thanks to: Thomas Eason, Kipp Frohlich, Jessica McCawley, Dave Telesco, Melissa Tucker, Kristen Sommers, Carli Segelson, Susan Carroll-Douglas, Dan Ellinor, Jennifer Eckles, Kelly Irick, Amanda Nalley, Meaghan Faletti, and Curtis Brown.

For her consultations and involvement in planning for this study (Task 2), we are grateful to Dr. Katherine A. McComas (Professor and Department Chair) in the Cornell University Communication Department.

Our message-testing instruments and request to conduct interviews with Florida residents were reviewed and granted approval by the Cornell University Office of Research Integrity and Assurance (Institutional Review Board for Human Participants Protocol ID# 1006001472).

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1. INTRODUCTION

Floridians seek assistance from the Florida Fish and Wildlife Conservation Commission (FWC) due to interactions with wildlife that they perceive as threatening or problematic. One of the goals of the Wildlife Assistance Program, within the Division of Habitat and Species Conservation of FWC, is to minimize human-wildlife conflict through educational messages and communications that help Floridians understand and effectively avoid, minimize, or mitigate negative interactions with those species. Late in 2013, FWC contracted with the Human Dimensions Unit at Cornell University to conduct research addressing information needs identified by the Wildlife Assistance Program.

FWC sponsored this research to increase their understanding of current messages being communicated about six species/species groups that are frequent sources of human-wildlife conflict in Florida: coyote, black bear, bats (all species in Florida), lionfish, monkeys (all species in Florida), and one lizard (i.e., Argentine black and white tegu). The project had two objectives:

1. Document key messages about wildlife conflict species that are being communicated to Floridians, through newspaper articles and FWC print and electronic media.

2. Inform development of FWC communications about wildlife conflict species that helps Floridians avoid and/or manage negative interactions.

The project objectives were satisfied by completing two research tasks. Task I was to analyze content of Florida newspaper articles and FWC documents related to the six species groups identified by FWC. In particular, FWC staff expressed interest in learning how media were framing stories about the conflict species, and how (or the extent to which) messages in FWC documents were being communicated through newspaper articles.

In Task II, HDRU and FWC staff developed messages about wildlife conflict species and tested them with panels of Florida residents. Based on findings from Study Task I (Siemer et al. 2014), the FWC study contact team directed us to focus Task II on three of the focal species: coyote, black bear, and lionfish. We developed messages for communication about negative impacts associated with those species and evaluated the messages with regard to how well they achieved specific communication goals, such as changing species-related risk perceptions or behavioral intentions. FWC staff are interested in crafting messages that influence certain behaviors among Floridians to avoid or mitigate negative interactions with wildlife but do not unnecessarily stigmatize wildlife as pests or vermin. They also want messages that are consistent, and communication that maintains the agency's image as a competent steward of wildlife resources and a trusted source of information on wildlife-related issues.

The purpose of this document is to report findings from Study Task II (i.e., results from message testing experiments). Before describing research methods used and study findings, we highlight some of the communication concerns FWC has with respect to each of the three focal species in Study Task II (i.e., coyotes, black bears, and lionfish), and we provide background information on a few key concepts that provided the conceptual foundations for research within Task II.

1.1. Communication Concerns Related to the Project Focal Species

In 2004, an extensive review of problematic species was initiated by a FWC Nuisance Wildlife Issue Team. In 2011, a Coyote Management Team (CMT) was formed in FWC to develop specific recommendations for coyote management in Florida; in particular, FWC responses to human-coyote conflicts. The CMT identified multiple gaps in social science information that were keeping FWC from implementing education and outreach activities necessary to achieve their desired future management condition (i.e., a future in which adverse impacts associated with coyotes are minimized, while positive impacts and benefits from coyotes are understood by Floridians) (FWC 2012a). Similar information gaps exist for other problematic species in Florida. This project was sponsored to address information gaps that need to be bridged to improve education and outreach for six problematic species selected by the FWC Contact Team for this project: coyote, Florida black bear, lionfish, bats, monkeys, and Argentine black and white tegu. The following communication concerns led to a decision to focus research on coyote, Florida black bear, and lionfish (the focal species for Study Task II).

Coyote: Coyotes have expanded their range into Florida over the last fifty years and are now found statewide. As a result, human-coyote interactions, which can be either positive or negative, have increased markedly. Citizens who interact with coyotes have differing degrees of outdoor experience, different levels of self-confidence with respect to dealing with wild animals, and differing expectations of governmental agencies' responsibilities for assisting people experiencing problem interactions. Coyote attacks on cats, dogs, and livestock have received high-profile media coverage. All of this has led to FWC concern about developing messages that address both the reality and perception of the risk posed by coyotes in Florida. In addition, FWC considers coyotes to be a naturalized species in the state and wants to communicate in a manner that avoids stigmatization of coyotes simply as "pests" or vermin.

The CMT summarized FWC management concerns in the following statement, and further into the report added that education and outreach activities should be a central feature of FWC's coyote management program.

> *The public now has to adapt to the presence of coyotes across most areas of Florida. People are increasingly seeing coyotes or experiencing problems associated with coyotes. These problems are usually categorized as nuisance issues. Nuisance issues can range from coyotes eating crops (for example, watermelons) to attacking pets and threatening people. Overall, increasing numbers of Floridians are looking to FWC for information and guidance on best management approaches to resolve the broad range of nuisance coyote problems. There is a need for FWC to develop an approach to management of the coyote in Florida that accounts for the presence of this highly adaptable predator as a wildlife species in natural habitats, while also providing a framework for addressing nuisance coyote issues wherever those issues may occur.* (FWC 2012a: 8)

Risks to pet (cat and dog) safety are an emerging issue in Florida. Keeping cats indoors and removing food attractants are recommended as strategies to reduce exposure of cats to risks

of harmful encounters with coyotes. No research has been done in Florida to understand how framing of that message affects behavioral intention to keep cats indoors.

Florida black bear: The goal of FWC's black bear management plan is to "Maintain sustainable black bear populations in suitable habitats throughout Florida for the benefit of the species and people" (FWC 2012b: v). To accomplish this goal, objectives focusing on population, habitat, conflict management, and education were created. Education and outreach programs are an important component of managing human-bear conflicts, which have been increasing as the number and distribution of bears has expanded in recent decades.

As the quote below demonstrates, information to improve the effectiveness of problem prevention information would contribute to successful implementation of objectives in FWC's bear management plan.

> *The last objective of the plan is to help Florida citizens have a better understanding of bears, support bear conservation measures, and contribute to reducing human-bear conflicts. This will be done by education and outreach programs; partnerships with government, non-governmental organizations, and other stakeholders; and developing "Bear Smart Communities" in areas of high bear activity. The objective's aim is to have at least 75% of the people who contact FWC comply with our conflict resolution advice.* (FWC 2012b:vi)

Additionally, FWC staff members are concerned about a steady increase in bear-related reports and complaints over the last two decades (FWC 2012b). Effective communication with Floridians experiencing problem interactions with bears will be key in avoiding the negative outcomes described below.

> *If this level of conflict continues in high complaint areas, there is concern it could create broad public antagonism towards bears, increase fear of bears, and promote a perception of bears as vermin. Education, waste management, technical assistance, trapping, relocation, and euthanasia will all have to be used to help mitigate complaints.* (FWC 2012b: 65)

Preventing negative human-bear encounters in residential settings is of particular concern to FWC. Food conditioning, the "process by which an animal associates humans or human spaces with food" (Hudenko, 2012 p. 17), often plays a part in human-black bear (and coyote) conflicts. Removing food attractants is a commonly recommended strategy to reduce the likelihood of negative human-bear (and human-coyote) interactions. Little research has been done in Florida to understand how framing of that message affects behavioral intention to make food attractants unavailable to bears (or coyotes).

Lionfish: Lionfish are an invasive marine species that has become established along the entire coast of Florida. FWC encourages scuba diving enthusiasts to assist with local lionfish control efforts by harvesting the species with spear gun, hand nets, or other means. As the quote below demonstrates, the rapid growth in lionfish populations in Florida's marine ecosystems has created grave concerns about potential ecological and economic impacts.

> *Lionfish (Pterois volitans) were introduced to the coastal waters of southern Florida more than 25 years ago. Since that time, lionfish have spread throughout the Caribbean and are now invading the Gulf of Mexico. Marine biologists are concerned that lionfish will significantly alter the population dynamics of our native marine species resulting in further impacts to the health of Florida's reefs. The lionfish invasion also has the potential to significantly impact recreational and commercial fishing and the overall economy of Florida.* (Lionfish: Be the Top Predator, myFWC)

FWC held a lionfish summit in 2013 to develop partnerships to facilitate research, outreach, and actions related to lionfish management. At the summit, FWC facilitators proposed a desired future condition statement that included two elements that might be addressed in the present research project. Lionfish were added to this study because related information needs were anticipated.

- *The general public knows about the negative ecological and social impacts of lionfish and is knowledgeable about what to do when they encounter them; and*

- *Stakeholders are engaged and empowered to implement appropriate management actions; (FWC 2013:4)*

Little research has been done in Florida to understand awareness of the lionfish invasion, or how issue frames influence perceived risks associated with expansion of lionfish populations.

2. FRAMING AND OTHER CONCEPTUAL FOUNDATIONS FOR TEST MESSAGES

Broadly speaking, framing denotes the process in which a particular conceptualization of an issue or thinking about an issue is developed or reoriented by people (for a review see Chong & Druckman, 2007). Goffman (1974) contends that individuals organize and interpret new information through the use of frames. Entman (1993), building on Goffman and other theorists, posits that framing implies selecting information "in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendations" (p.52). In communication terms, a frame "organizes everyday reality" (Tuchman 1978, p. 193) by attaching "meaning to an unfolding strip of events" (Gamson & Modigliani 1987, p. 143) and emphasizing "particular definitions and interpretations of political issues" (Shah, Watts, Domke, & Fan, 2002, p. 343). Frames in communication are very important because they have an impact on the attitudes and behaviors of their audiences (Chong & Druckman, 2007).

The primary goal of the FWC message-testing experiments is to discover effective messages that can motivate Floridians to adopt problem-prevention or mitigation behaviors regarding human-wildlife interaction. Numerous theories and models are pertinent to message effects. However, it is not possible to apply all those theoretical concepts to message-testing studies within a limited amount of time and resources. To select among possible message frames, one needs to consider the specificity of the context where the messages will be used and how effective those framing approaches are in general. Given the context for communicating about conflict species and literature on effectiveness of using various framing approaches we decided

to test six frames (i.e., gain/loss frame, self/other-referencing, and individual/collective exemplar) for black bear and coyote messages, and two frames (i.e., ecological/economic) for lionfish messages. These approaches are rooted in understanding of accepted behavior change and information processing theories (Cappella, 2006) and can easily be incorporated into message design.

2.1. Gain/Loss Frame

A gain-framed message focuses on the advantages of adopting a recommended behavior (e.g., "if you exercise regularly, you will reduce your chance of developing heart disease"). A loss-framed message emphasizes the disadvantages of not performing the advocated behavior (e.g., "if you don't exercise regularly, you will increase your chance of developing heart disease") (Nan, 2012a). Behavioral consequences, personal stories, statistics, arguments, and other message elements can be presented in terms of possible gains or losses for the message consumer.

Gain versus loss framing has received substantial attention from communication researchers and has been shown to influence people's perceptions, attitudes and behavior intentions in a number of different contexts (for reviews, see Rothman, Bartels, Wlaschin, & Salovey, 2006; Rothman & Salovey, 1997). In research on prevention behaviors, loss-framed messages typically lead to greater concern or perceived personal risk, but most studies have found that gain-framed messages motivate behavioral compliance to a greater extent (see Rothman & Salovey, 1997, for a review). In fact, in a recent meta-analysis of persuasive message framing, there was a small but significant advantage for gain-framed appeals over loss-framed appeals for disease-prevention behaviors (O'Keefe & Jenson, 2006).

Although they have been applied in many domains, effects of gain and loss frames have not been evaluated in the context of communication about human-wildlife conflict. Testing the gain and loss frames allows FWC to assess whether general findings about these frames can be applied to the context of communication about conflicts with black bears and coyotes in Florida. In addition, research can shed light on whether gain versus loss framing produces differential influences on Floridians with different demographic backgrounds (e.g. male vs. female, young vs. old) (Nan, 2012b). It would be valuable for FWC to understand whether they should be using common or different strategies to communicate about minimizing conflicts with black bear and coyote.

2.2. Self/Other-Referencing

Persuasive appeals often focus on an individual or group of people who may benefit or suffer as a result of a given behavior. For example, a message may stress that recycling preserves one's own quality of life (self-referencing) or makes life better for one's community (other-referencing). A large literature on self-referencing suggests that including such references can increase attention to a message and thus facilitate the persuasion attempt (Loroz, 2007).

Despite the prevalence of the self-referencing effects across numerous domains and comparison tasks, some researchers suggest that other-referencing may be more likely to reduce people's resistance to persuasion efforts and increase their acceptance of the message's

recommendations (McGuire, 2001). A meta-analysis indicated that other-referenced messages are more likely to increase health intentions than self-referenced messages (Keller & Lehmann, 2008). The authors explain this finding by noting that people generally believe that negative outcomes are more likely for others than for themselves (Menon, Block, & Ramanathan, 2002). In addition to such logical considerations, other-referencing may also induce emotional and motivational desires to change, namely by arousing feelings of anticipated guilt or regret for not avoiding potentially harmful consequences to loved ones.

Framing effects of self versus other referencing can also interact with those of gain versus loss framing. In a message-testing study on promoting recycling behaviors, Loroz (2007) found that loss frames appear to be more persuasive when the message is self-referencing, while gain frames are more persuasive when the message involves other-referencing. By testing messages that pair framing elements (e.g., gain frame with self referencing vs. gain frame with other referencing) we were able to explore the effects of combining framing approaches in the context of communication about black bear and coyote conflict management.

In this project, the use of self- versus other-referencing is especially relevant because there may be multiple parties involved in a given human-wildlife conflict. For instance, human-black bear conflicts may involve the individual who reads a message, her family and pets, her neighborhood and community, and specific bears. A message that focuses on adopting specific prevention behaviors to protect one's family is expected to have different effects than a message that focuses on protecting one's community or the bears.

For some target audiences, such as women (Dube & Morgan, 1996) and Hispanics (Walker et al. 2007), effects on others may be more salient. Those audiences may respond more to messages that emphasize the harmful consequences to others. Our message-testing studies will allow us to ask questions about which referencing style may be more persuasive for a particular population.

2.3. Individual Exemplar/Collective Exemplar

An exemplar is a relatively short story in which the experiences of a (real or fictitious) person are described and used to illustrate a more general phenomenon. Exemplars are used frequently in all types of messages, including advertisements and newspaper articles (Brosius, 2001; Zillmann & Brosius, 2000). Research has consistently shown that including an exemplar in a message enhances its persuasiveness (e.g., Kim, Bigman, Leader, Lerman, & Cappella, 2012).

When communicating the potential consequences of a behavior, one can employ a specific illustrative anecdote (e.g., individual exemplar) or more general statements (e.g., collective exemplar). Studies (Brosius & Bathelt, 1994; Stapel & Velthuijsen, 1996) have demonstrated that the individual exemplar can be more persuasive than a collective exemplar, because it is more likely to aid comprehension and message processing. A collective exemplar that describes the consequences of a behavior performed by a general population may not produce immediate dispositional judgments as easily as an individual exemplar because a collective exemplar does not focus on a particular person (Niederdeppe, Kim, Lundell, Fazili, & Frazier, 2012).

A collective exemplar can have persuasive power, nevertheless. The persuasive power of a collective exemplar lies in its reliance on descriptive norms, which refer to a person's perception of how other people are actually behaving. When a message mentions that many residents are engaging in a particular behavior to prevent human-coyote conflicts, for example, that message is more likely than the individual exemplar to give message readers the impression that other people are actually performing the recommended behavior. Normative appeals have proven to be persuasive in motivating recommended behaviors (e.g., Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). One of our message testing studies examines two types of exemplars to determine which is most effective in eliciting particular behavioral intentions among particular demographics.

2.4. Ecological/Economic Framing

Current FWC documents emphasize the general negative impacts of lionfish on marine ecosystems, thus framing the lionfish invasion issue is an ecological problem. It is not known how well this frame resonates with particular audiences. For some Floridians, an economic frame may be more relevant and effective in elevating perceived importance of the lionfish invasion issue. Moreover, the relative effects of general and specific message frames for raising perceived importance of the lionfish issue are currently unknown. Therefore, in our lionfish message testing, we investigate the persuasiveness of four messages (general ecological frame, general economic frame, specific ecological frame, and specific economic frame). We expect that these four messages function differently for different populations. For example, different age groups may be concerned with different consequences.

3. METHODS

3.1. Message Development and Pretesting

Messages are the instruments people use to achieve changes. Messages influence not only individuals but also societal groups, organizations and institutions (Cho, 2012). Message testing is based on the idea that persuasive appeals can be carefully designed to easily and clearly convey an idea to relevant publics (Yan, Dillard, & Shen, 2012). Message-testing studies usually start with a few potential messages and test them on potential audiences, trying to discover the most suitable message(s) that can achieve particular communication goals.

We created eighteen message variations (six messages variations for black bear food conditioning, and four message variations each for coyote food conditioning, coyote/pet safety, and lionfish impacts) (Appendices A-C). The content of these messages was based on communication literature as well as content from newspaper articles and FWC documents that were coded in Task 1. Table 1 provides a summary of frames used for each of the messages.

Table 1. Frames used in the message conditions for each species.

Species / Conditions	Black Bear	Coyote		Lionfish
	Food Conditioning	Food Conditioning	Pet Safety	
Condition #1	Gain Frame, Self-Referencing	Gain Frame, Self-Referencing	Gain Frame, Individual Exemplar	General Ecological Impacts
Condition #2	Loss Frame, Self-Referencing	Loss Frame, Self-Referencing	Loss Frame, Individual Exemplar	Specific Ecological Impacts
Condition #3	Gain Frame, Community-Referencing	Gain Frame, Community-Referencing	Gain Frame, Collective Exemplar	General Economic Impacts
Condition #4	Loss Frame, Community-Referencing	Loss Frame, Community-Referencing	Loss Frame, Collective Exemplar	Specific Economic Impacts
Condition #5	Gain Frame, Bear-Referencing	N/A	N/A	N/A
Condition #6	Loss Frame, Bear-Referencing	N/A	N/A	N/A
Control Condition	No Message	No Message	No Message	No Message

We pretested all message variations using Amazon's Mechanical Turk (https://requester.mturk.com/). Mechanical Turk (MTurk) is an online crowdsourcing service that can connect researchers to willing participants for electronic survey instruments (Brandon et al., 2014). Although MTurk is a relatively new tool for collecting social psychological data, research has demonstrated that participants are demographically diverse and the data that they provide for research can be as reliable as other traditional data collection methods (Buhrmester, Kwang, & Gosling, 2011; Paolacci, Chandler, & Ipeirotis, 2010).

The purpose of the pretest was to verify that participants could identify and understand the predominant frame used in each message. Messages were posted on MTurk until at least 70 responses were obtained (Table 2). Based on the results of the pretest, two of the messages (bear and coyote food conditioning) were revised and pretested a second time. We used chi square tests and ANOVAs to identify differences between pretest groups.

Table 2. Total number of responses for each pretest.

Pretest Name	Number of Responses
Bear Food Conditioning	162
Coyote Food Conditioning	116
Coyote/Pet Safety (Cats)	80
Lionfish	106
Bear Food Conditioning 2nd Pretest	90
Coyote Food Conditioning 2nd Pretest	77
Total	**631**

3.2. Survey Instruments

3.2.1. Behavioral intention

One goal of this research is to provide FWC information that can inform development of messages that motivate Floridians to adopt problem-prevention behaviors. Therefore, we designed messages centered on problem-prevention behavior, and developed a set of questionnaire items about behavioral intentions. Respondents were asked to indicate how likely they were to engage in 15 different behaviors in the next year (on a 7-point scale, from very unlikely [1] to very likely [7]). Instruments for the coyote and black bear experiments contained behavioral intention questions related to various prevention actions, information seeking actions, and interactions with other people related to black bears or coyotes. Instruments for the lionfish-focused experiment contained behavioral intention questions related to various prevention

actions, information seeking actions, eating lionfish, and participating in lionfish control events/activities.

3.2.2. Risk perception

Our test messages contained information that may influence wildlife-related risk perception, which is comprised of both perceived severity of a threat and perceived susceptibility to a threat. Questionnaires included one measure of perceived severity (7-point response scale, from "not at all serious" [1] to "very serious" [7] consequences for self and family, for pets, or for communities) and one measure of perceived susceptibility to wildlife-related risks (7-point response scale, from "very unlikely" [1] to "very likely" [7] that specific negative human-wildlife interactions would occur). The referent threat (e.g., threats to people, pets, community, environment, economy) varied by experiment.

3.2.3. Emotional response

Emotions play an important part in people's daily judgments and decision-making processes. We were interested in whether different message treatments would elicit different emotional responses and how those emotional responses might influence behavioral intentions. It also was important for us to confirm the extent to which the messages we crafted induced negative emotions.

We asked respondents the extent to which they felt various emotions after reading the message they were given (or the extent to which they felt a particular emotion at the moment they were completing their questionnaire in the control condition). All emotion questions used a 7-point response scale (1=none of this feeling, 7=a lot of this feeling). The emotions measured varied by experiment.

3.2.4. Attitudes, subjective norms, and self-efficacy

The Theory of Planned Behavior (Ajzen, 1991) posits that attitudes, subjective norms, and self-efficacy influence behavioral intention, and behavioral intention influences expressed behavior. Our questionnaires included measures of attitudes, subjective norms, and self-efficacy because we expected those concepts to be mediating variables between message treatments and behavioral intentions.

We created 7-point, semantic-differential items to assess five attitudes toward making foods unavailable to coyotes or bears: ineffective (1) to effective (7); unwise (1) to wise (7); worthless (1) to valuable (7); useless (1) to useful (7); and unfavorable (1) to favorable (7). In the lionfish experiment respondents were asked if they believed addressing the lionfish issue was unnecessary (1) to necessary (7); or unimportant (1) to important (7).

Communication scholars have found mixed results on which referencing type (i.e., referencing self or other) generates a more favorable attitude toward a recommended behavior (Park & Smith, 2008). We hypothesized that the self-referencing messages would be more persuasive for people who sense a stronger behavioral norm from their family; we expected

community-referencing messages would be more persuasive for people who sense a stronger behavioral norm from other people in their community. In the coyote and bear food conditioning experiments we asked respondents whether they agreed or disagreed with three normative belief statement (e.g., "My family thinks that I should secure food and garbage that might attract coyotes") (range 1-7, 1=strongly disagree, 7=strongly agree).

We hypothesized that self-efficacy would mediate emotional responses and behavioral intention. In the coyote and bear food conditioning experiments we asked respondents whether they agreed or disagreed with three self-efficacy statements (e.g., "I'm confident in my ability to keep all food that might attract coyotes out of their reach") (range 1-7, 1=strongly disagree, 7=strongly agree). In the coyote/pet safety experiment we also asked respondents whether they agreed or disagreed with three self-efficacy statements (e.g., "I can always keep my pets under my control when outside"). The lionfish experiment did not contain self-efficacy measures.

3.2.5. Beliefs about referent species

Newspaper content analysis completed in the first part of this study (Siemer et al. 2014) identified commonly-used descriptors of coyotes, black bear, and lionfish. We included multiple items in each questionnaire to assess beliefs about the perceived positive and negative traits of each conflict species (e.g., traits such as timid, bold, intimidating, beautiful). We asked respondents whether they disagreed or agreed that the species held those traits, on a scale of 1 ("strongly disagree") to 7 ("strongly agree"). These items allowed us to assess whether exposure to messages led to change in beliefs about each species.

3.2.6. Message evaluation

We included several items in each questionnaire to confirm that respondents had read and comprehended the message they were asked to read. We asked respondents whether they found the message they read to be clear, logical, and informative (7-point scale from strongly disagree to strongly agree). We also included questions to document whether respondents noticed that the message they read included self or community referencing. For example, respondents who received the family-referencing message text in a coyote message were asked to indicate whether the message they had just read emphasized the importance of protecting one's family from negative interactions with coyotes, or whether the message emphasized protecting one's community. Finally, we included one question to assess respondents' perceptions of message quality (i.e., if the message was logical, informative, and clear). These quality assessments were used to compare perceived quality across message treatments within each experiment.

3.2.7. Respondent demographics and traits

We gathered background information on each respondent, including: gender, age, highest level of education, household income, race, Florida county of residence, years of residence in Florida, residency status (e.g., seasonal or full-time), presence/absence of children and pets in a household, participation in wildlife- related activities, and experience with the referent species. These questions helped us to characterize the respondent group and understand how they compared to the population of Florida.

3.3. Survey Implementation and Analysis

We created the survey instruments using Qualtrics (http://www.qualtrics.com/), an online survey builder tool. Participants were recruited through the Qualtrics panel service. We provided Qualtrics with our target demographics and electronic links to survey instruments. Qualtrics staff administered the survey (i.e., they made the distributed survey links available to participants, collected responses, and provided data from completed questionnaires to HDRU for analysis). "The size of Qualtrics' participant pool, its ability to solicit participants from its research partnerships, and the availability of demographic screens allow the researchers to obtain some relatively focused and externally valid samples" (Brandon et al., 2014, p. 11). All four surveys were distributed to samples of Florida residents. For the black bear and coyote food conditioning surveys, we obtained a nearly even split of rural and urban Floridian residents. Rural counties were identified using the 2014 Florida Statute (288.0656) that defines a rural county as: (1) one with a population of 75,000 or fewer, or (2) one with a population of 125,000 or fewer which is contiguous to a county with a population of 75,000 or fewer. A map of Florida counties designated as rural is provided in Figure 1.

Our target sample sizes for the black bear and lionfish experiments were 800 per experiment. Our target sample size for the coyote-related surveys was 900 (about 450 each in the food conditioning and pet safety experiments). For each of these experiments, a control group answered the questionnaire without receiving any message. In each experiment, the number of people in each treatment group and the control group was approximately equal.

The surveys were launched over the course of a month during the Fall of 2014. Qualtrics collected the data and sent it to us after they reached the quotas we had set for each survey. The target number of responses were defined to obtain the largest sample sizes possible within budget limitations.

We used IBM SPSS Statistics 21.0 (SPSS 2012) software to calculate frequencies and measures of central tendency (e.g., mean). We used chi-square tests and analysis of variance (ANOVA) to test for significant differences between treatment groups. We used one-way ANOVAs to compare message conditions with the control condition. We used two-way ANOVAs to examine the main and interaction effects of message components on respondents' behavioral intentions, emotional responses to the messages, risk perception, attitudes toward recommended behaviors, and beliefs about the referent species. We used ordinary least-squares regression and three-way ANOVAs to identify relationships between moderating variables and behavioral intentions. We used a regression technique called spotlight analysis (Aiken & West, 1991; Fitzsimons 2008) to identify 3-way interactions between key variables. We examined the following variables respectively as moderators to further segment the general population: gender, age, race, education, household income, years of residence in Florida, county location, pet ownership, participation in wildlife-related activities, children at home, experience with coyotes, tolerance of wildlife problems, perceived benefits of wildlife, self-efficacy, and social norms. All differences are reported at the $P < 0.05$ level.

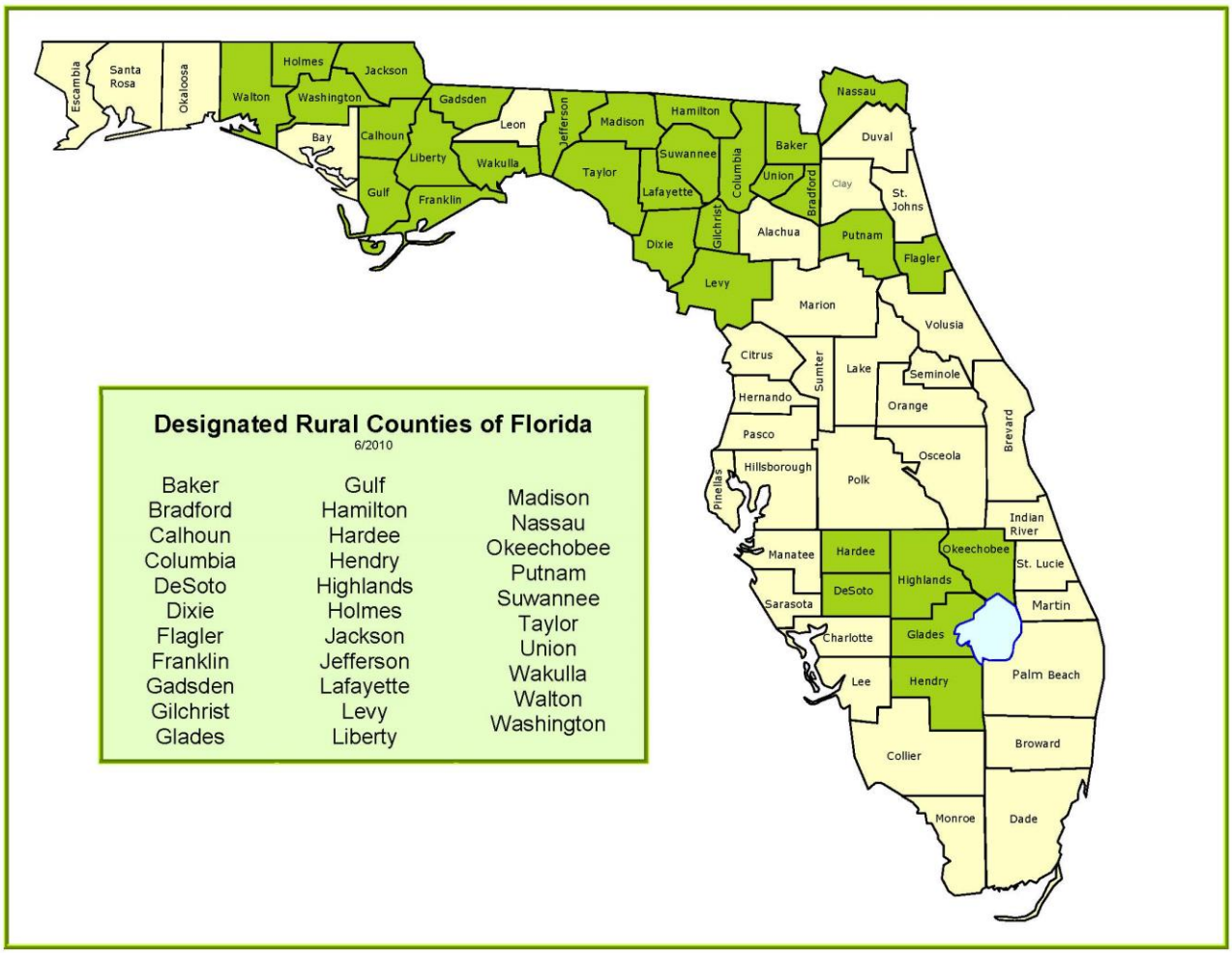

Figure 1. Map of the Designated Rural Counties of Florida (FL Statute 288.0656)

4. RESULTS

4.1. Respondent Characteristics

Qualtrics, the firm contracted to implement the surveys, was asked to keep survey sites open until a target minimum of 800 questionnaires were completed per species. Over 900 completions were received for the coyote message experiments (460 for the coyote food conditioning message experiment and 460 for the coyote/pet safety message experiment) (Table 3).

In all message experiments, a majority of respondents were white, female, year-round residents of Florida (Appendix D-G, Table D1, Table E1, Table F1, Table G1). In all experiments we obtained responses from residents across the state (Figure 2-5). The black bear and coyote food-conditioning message experiments used sampling strategies designed to obtain approximately equal proportions of respondents from urban and rural counties. The coyote/pet safety and lionfish message experiments did not include such efforts, and consequently few respondents (approximately 2%) lived in rural counties.

In all four message experiments, chi-square tests and one-way ANOVA comparisons of group means revealed no significant differences in respondents' demographic characteristics across conditions, confirming the success of experimental randomization. These findings increase confidence that any differences observed in behavioral intentions between treatment groups can be attributed to message treatments, not demographic differences.

Table 3. Outcomes of participant visits to Qualtrics survey website, by experiment.

Outcome	**Experiment**			
	Coyote food conditioning	Bear food Conditioning	Coyote/pet safety	Lionfish issue awareness
Completed Survey	460	811	460	810
Did not pass Attention Filter	33	69	19	---
Completed Survey too Quickly	11	15	11	24
Not Florida Resident	4	10	---	---
Over Quota[1]	634	889	562	110
Total	**1,142**	**1,794**	**1,052**	**944**

[1]Once completion quotas were reached, each survey website was closed. The completion quota was far exceeded in the black bear and coyote-related surveys because those websites remained opened until approximately half of the quota was obtained from respondents in rural counties. Data from questionnaires in the over quota category were not released to Cornell researchers by Qualtrics and are not included in the analysis.

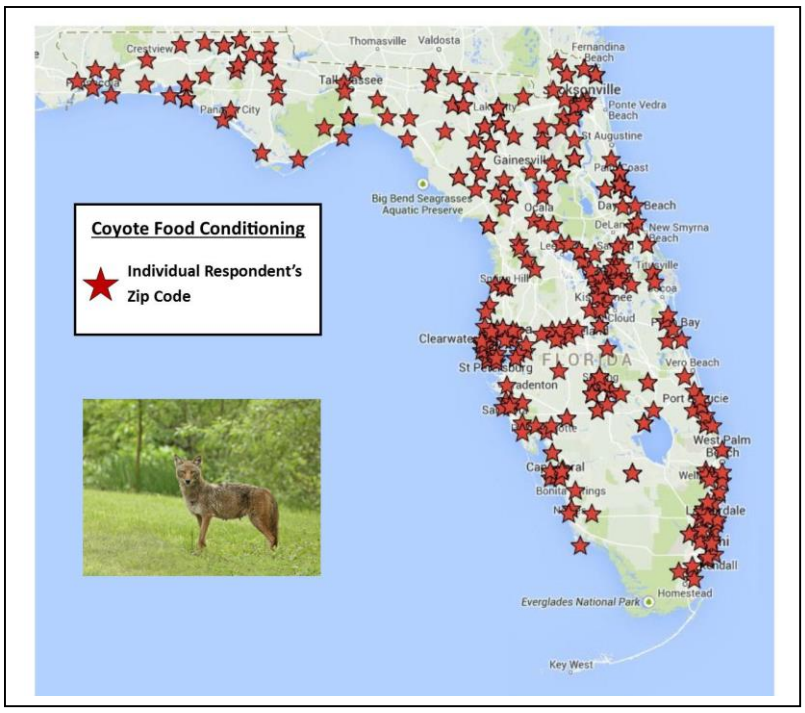

Figure 2. Distribution of responses, all conditions for coyote food-conditioning message experiment.

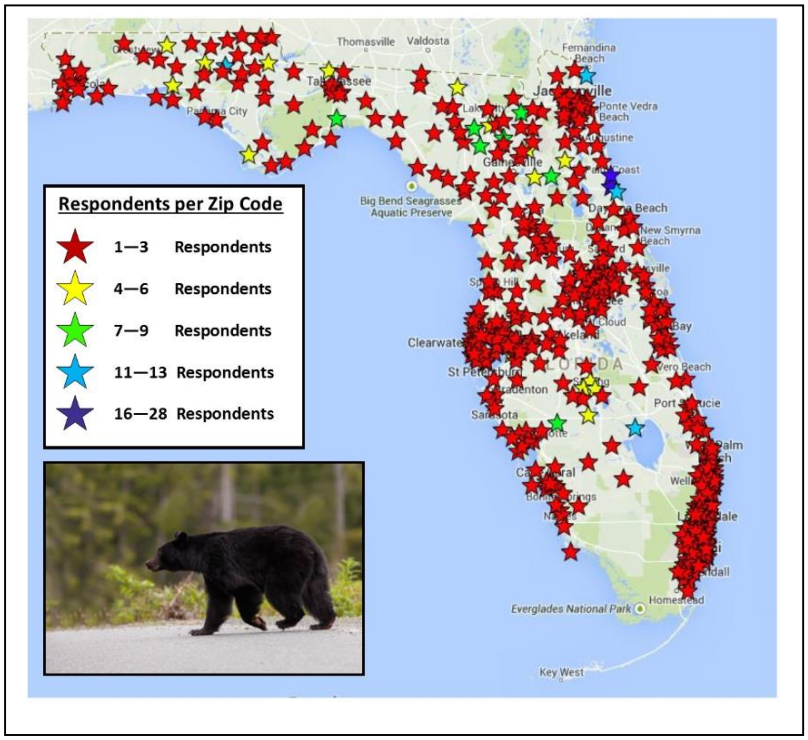

Figure 3. Distribution of responses, all conditions for black bear food-conditioning message experiment.

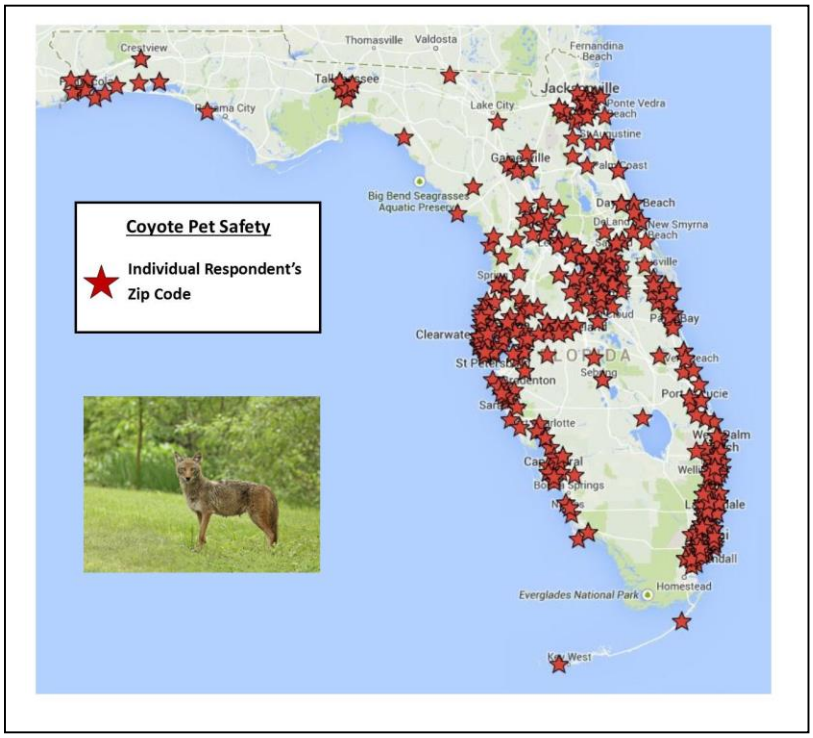

Figure 4. Distribution of responses, all conditions for coyote/pet-safety message experiment.

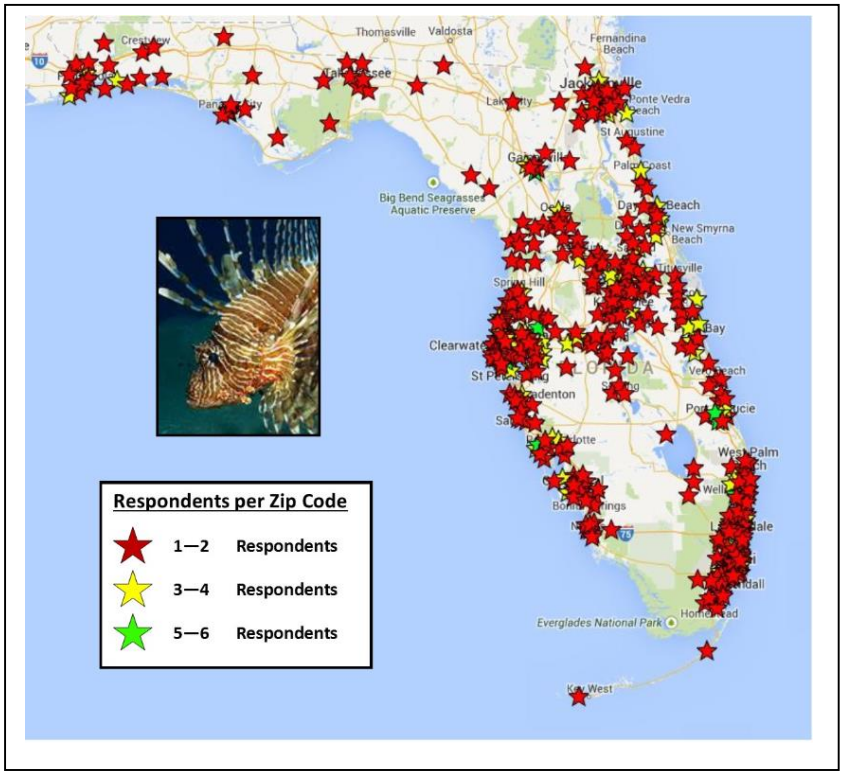

Figure 5. Distribution of responses, all conditions for lionfish message experiment.

4.2. Message Manipulation Checks

Overall, findings confirmed that our experimental manipulation of messages was successful. In all four experiments, the majority of respondents were able to accurately recall the key references in the message they were given. Moreover, in every experiment: (1) most respondents agreed that the message they read was clear, logical, and informative; and (2) there were no significant differences across message treatment groups with regard to respondents' perceptions of message logic, clarity, and information value.

4.2.1. Coyote food conditioning message checks

Respondents noticed that the key references in the message they read had emphasized family or community, and personal loss or personal gain. Significantly more respondents in the two family-referencing conditions (N=108) indicated that the messages they read emphasized the importance of protecting one's family than those in the two community-referencing conditions (N=68). Significantly more respondents in the two community-referencing conditions (N=117) indicated that the messages they read emphasized the importance of protecting one's community than those in the two family-referencing conditions (N=77), chi square = 17.34, $p < 0.001$. Respondents ($M = 5.87$, $SD = 1.67$) exposed to the two gain-frame messages were more likely to notice the benefits of following the recommended behaviors than those ($M = 5.19$, $SD = 2.14$) exposed to the two loss-frame messages, $F = 11.46$, $p = 0.001$.

4.2.2. Black bear food conditioning message checks

A majority of respondents noticed that the key references in the message they read had emphasized family, community or bears, and personal loss or personal gain. More participants in the family-referencing conditions indicated that the messages they read emphasized the importance of protecting one's family (N=84) than those in the community-referencing (N=48) or bear-referencing (N=37) conditions; more participants in the community-referencing conditions indicated that the messages they read emphasized the importance of protecting one's community (N=82) than those in the family-referencing (N=78) or bear-referencing (N=43) conditions; and more participants in the bear-referencing conditions indicated that the messages they read emphasized the importance of protecting bears (N=152) than those in the family-referencing (N=75) or community-referencing conditions (N=91) (chi square = 64.86, $p < 0.001$). Respondents exposed to the three gain-frame messages were more likely to notice the benefits of following the recommended behaviors ($M = 5.79$, $SD = 1.60$) than those exposed to the three loss-frame messages ($M = 5.37$, $SD = 2.01$) ($F = 9.16$, $p = 0.003$).

4.2.3. Coyote pet safety message checks

A majority of respondents noticed that the key references in the message they read had emphasized an individual or community exemplar, and a loss or gain frame. More participants in the individual exemplar conditions indicated that the messages they read mentioned a particular pet owner (N=137) than those in the community exemplar (N=69) conditions, and more participants in the community-exemplar conditions indicated that the messages they read did not mention a particular pet owner in Florida (N=107) than those in the individual exemplar (N=50)

conditions (chi square = 42.85, $p < 0.001$). Respondents exposed to the two gain-frame messages were more likely to notice the benefits of following the recommended behaviors than those exposed to the two loss-frame messages ($F = 7.34$, $p = 0.007$).

4.2.4. Lionfish message checks

A majority of respondents noticed that the key references in the message they read had emphasized ecology or economy, and related general or specific information. Participants in the ecology conditions were more likely to indicate that the messages they read emphasized the ecological impacts of lionfish (N=281) than those in the economy (N=170) conditions, while participants in the economy conditions were more likely to indicate that the messages they read emphasized the economic impacts of lionfish (N=161) than those in the ecology conditions (N=34) (chi square = 109.7, $p < 0.001$). Respondents (N=80) in the general frame conditions were less likely to indicate that the messages they read mentioned specific information than those (N=260) in the specific frame conditions, while respondents (N=64) in the specific frame conditions were less likely to indicate that the messages they read did not mention specific information than those (N=243) in the general frame conditions (chi-square = 199.66, $p < 0.001$).

4.3. Results of Coyote Food Conditioning Experiment

Box 1. *Coyote food conditioning experiment –Key findings and conclusions*

The main objective of this experiment was to learn how four message frames may influence intentions to engage in behaviors that prevent coyote food conditioning. We found that respondents exposed to any of the four messages (i.e., family-gain, community gain, family-loss, community-loss) exhibited higher intentions to engage in seven problem-prevention actions than respondents in the control group. Thus, all four seem to hold promise as frames for FWC messages to promote those problem-prevention behaviors. Results suggest that family-gain frames may be particularly effective to stimulate problem prevention actions among some audiences (e.g., those who have seen a coyote in the wild, residents of rural counties).

Supporting details:

- Intentions to keep bird feeders out of coyotes' reach, seek out more information about coyotes, and avoid going to places where coyotes frequent was higher among respondents exposed to family-referencing messages than among those exposed to community-referencing messages.
- Intentions to secure garbage and compost in animal-proof containers was higher among those exposed to family-referencing, gain-frame message than among those exposed to the community-referencing, gain-frame message.
- For respondents who had seen coyotes in the wild, the family-referencing, gain-frame message was more persuasive than the family-referencing, loss-frame message and the community-referencing, gain-frame message in promoting five recommended behaviors.
- For respondents with low self-efficacy, the family-referencing, gain-frame message was more persuasive in promoting recommended behaviors than the family-referencing, loss-frame messages.
- For rural respondents, the gain-frame messages were more persuasive in promoting recommended behaviors than the loss-frame messages.

4.3.1. Main and interaction effects of message conditions

The following subsections are organized based on the variables we included in the questionnaire to facilitate comparisons across different message conditions.

4.3.1.1 Behavioral intentions related to coyote food conditioning

We asked respondents how likely they were to engage in 15 problem-prevention behaviors (Appendix D, Table D2). On 7 out of 15 behavioral intentions all the messages presented were associated with higher levels of behavioral intention than was observed in the control condition, indicating that all of the messages had some persuasive power (Table D2, Table D3). Most respondents had no intention to engage in some of the listed actions (i.e., most had no intention to feed coyotes, kill or remove coyotes, or hire a trapper to remove coyotes) and none of the messages was associated with increased intentions to engage in those actions (Table D2).

We found significant differences between groups on nine behavioral intentions (Table 4). Specifically, we found main effects of family versus community referencing on several behaviors. After being exposed to family-referencing messages, respondents were more likely to report intentions to keep bird and wildlife feeders out of coyotes' reach (M_F = 5.73, SD = 1.75; M_C = 5.12, SD = 2.21), pick up leftovers if feeding pets outdoors (M_F = 5.88, SD = 1.71; M_C = 5.16, SD = 2.25), remove all pet food from their yard (M_F = 6.02, SD = 1.64; M_C = 5.06, SD = 2.37), seek out more information about coyotes (M_F = 4.31, SD = 1.75; M_C = 3.83, SD = 2.12), and avoid going to places where coyotes frequent (M_F = 2.42, SD = 1.73; M_C = 2.12, SD = 1.58) than those exposed to the community-referencing messages ($p < 0.05$).

Perhaps most important for FWC communications, we found significant interaction effects between family versus community referencing and gain versus loss frame on intentions to secure garbage and compost in animal-proof containers and report neighbors that are feeding coyotes. Particularly, the family-referencing, gain-frame message (M = 6.26) induced higher intention to secure garbage and compost in animal-proof containers than the family-referencing, loss-frame message (M = 5.44) or the community-referencing, gain-frame message (M = 5.52) ($p < 0.05$) (Table 4). The family-referencing, gain-frame message (M = 5.37) also elicited higher intention to report neighbors that are feeding coyotes than the family-referencing, loss-frame messages (M = 4.59) ($p < 0.05$) (Table 4).

4.3.1.2. Emotional Responses

We found main effects of gain versus loss frame on fear and optimism. Specifically, loss-frame messages induced more fear than gain-frame messages (M_G = 2.29, SD = 1.74; M_L = 2.76, SD = 1.85), whereas gain-frame messages induced more optimism than loss-frame messages (M_G = 4.10, SD = 1.87; M_L = 3.68, SD = 1.81) ($p < 0.05$). Additionally, when compared to the control condition, 3 message conditions (family-gain, family-loss, and community-loss) induced higher fear and sadness, and all four messages induced lower optimism (Table 4). No significant differences in feelings of anger or guilt were observed between groups (Table D4).

4.3.1.3. Risk Perception

We did not identify any significant main or interaction effects of message components on either perceived threats coyotes pose to people and pets (i.e., perceived risk severity) or the likelihood that coyotes would harm people or their pets (i.e., perceived risk susceptibility). Moreover, we found that risk perceptions were no different between the message treatment and control groups

(Table D5 and Table D6). In all groups respondents perceived coyotes as a relatively low threat to themselves and their family members.

4.3.1.4. Attitudes toward Recommended Behaviors

We asked respondents to indicate their attitudes toward the practice of keeping food out of reach of coyotes as a way of preventing human-coyote conflicts on 4 semantic differential scales. A majority of respondents in all treatment groups agreed that keeping food and garbage out of the reach of coyotes was effective, wise, valuable, and useful (Table D7). Agreement with these attitude statements was just as high in the control group as it was in the message treatment groups.

We found a main effect of gain versus loss frame on the unwise-wise differential. Specifically, respondents exposed to the gain-frame messages were more likely to think keeping food out of reach of coyotes was a wise way of preventing human-coyote conflicts than those exposed to the loss-frame messages (M_G = 6.56, SD = 1.12; M_L = 6.30, SD = 1.44) ($p < 0.05$). No other significant main or interaction effects were found.

4.3.1.5. Beliefs about Coyotes

Respondents were asked to indicate agreement/disagreement with seven possible traits that coyotes might possess (Table D8). We found a main effect of gain versus loss frame on perceived timidity of coyotes: respondents exposed to gain-frame messages were more likely to perceive coyotes as timid than those exposed to loss-frame messages (M_G = 4.32, SD = 1.69; M_L = 3.89, SD = 1.79) ($p < 0.05$). Furthermore, when compared with the control condition, 3 message conditions (family-gain, community-gain, and family-loss) made respondents more likely to think that coyotes were timid.

4.3.2. Message effects on segmented populations

Our analysis tested if the four experimental messages produced different influences on the dependent variables examined in the previous section, when taking into account the different levels of 15 possible moderating variables. We found that three variables (i.e., seeing coyotes, self-efficacy, and county of residence [urban/rural]) were moderators of behavioral intentions.

4.3.2.1. Moderating effects of having seen coyotes in the wild

We asked respondents to indicate whether they had seen a coyote in the wild and used their answers as a binary variable (1=Yes, 0=No) to include in the three-way ANOVAs for our analysis. In Table 5, we show the significant three-way interaction results found in this analysis.

Several results indicated that a family-referencing, gain-frame resonated with respondents who had experience with coyotes. For respondents who had seen coyotes in the wild, the family-referencing, gain-frame message was more persuasive than the family-referencing, loss-frame message and the community-referencing, gain-frame message in promoting five recommended

behaviors (i.e., keeping feeders out of reach; securing garbage and compost; reporting neighbors who feed coyotes; seeking out more information; avoiding places coyotes frequent).

In addition, for respondents who had never seen coyotes in the wild, the family-referencing, loss-frame message was more persuasive than the community-referencing, loss-frame message for two behaviors (i.e., keeping feeders out of reach and removing pet food from the yard).

4.3.2.2. Moderating effects of self-efficacy

We found three instances in which self-efficacy served as a moderator of behavioral intentions. Significant three-way interaction results are shown in Table 6. For respondents with low self-efficacy, the family-referencing, gain-frame message was more persuasive than the community-referencing, gain-frame message or the family-referencing, loss-frame message in promoting two recommended behaviors (i.e., reporting neighbors that are feeding coyotes and asking neighbors to remove food that might attract coyotes). For respondents with high self-efficacy, the family-referencing, loss frame was more likely than the community-referencing, loss message to encourage respondents to keep feeders out of coyote's reach.

4.3.2.3. Moderating effects of county locations

We used county residence type (i.e., urban or rural) as a binary variable in our analysis of interaction results between county location and gain versus loss frame. We did not find any significant three-way interaction effects, but we did find significant two-way interaction results (reported in Table 7). For rural respondents, the gain-frame messages were more persuasive than loss-frame messages in encouraging readers to keep feeders out of coyote's reach and share information about coyotes. For urban respondents, loss-frame messages were more persuasive than gain-frame messages in encouraging readers to pick up leftover pet food if feeding pets outdoors.

Table 4. Means of behavioral intentions, emotions, and beliefs that differed by experimental conditions in the coyote food conditioning experiment.

	Family Gain	Community Gain	Family Loss	Community Loss	Control
Behavioral Intentions: (1=very unlikely, 7=very likely)	N Mean	N Mean	N Mean	N Mean	N Mean
Keep bird and wildlife feeders out of coyotes' reach	71 **5.85^{a}**	75 **5.24^{b}**	78 **5.63^{c}**	81 **5.00^{d}**	70 **3.93^{abcd}**
Secure garbage and compost in animal-proof containers	82 **6.26^{aef}**	87 **5.52^{be}**	86 **5.44^{cf}**	89 **5.56^{d}**	83 **4.80^{abcd}**
Pick up leftovers if feeding pets outdoors	45 **6.07^{a}**	48 4.92	55 **5.73^{b}**	46 **5.41^{c}**	61 **4.48^{abc}**
Remove all pet food from your yard	46 **6.24^{a}**	54 4.78	52 **5.83^{b}**	52 **5.35^{c}**	63 **4.46^{abc}**
Report neighbors that are feeding coyotes	79 **5.37^{ae}**	84 **4.74^{b}**	82 **4.59^{ce}**	87 **4.99^{d}**	76 **3.45^{abcd}**
Ask neighbors to remove food that might attract coyotes	82 **4.91^{a}**	87 **4.30^{b}**	85 **4.52^{c}**	88 **4.50^{d}**	79 **3.39^{abcd}**
Ask neighbors to secure trash so that it is not available to coyotes	81 **4.95^{a}**	87 **4.39^{b}**	87 **4.55^{c}**	91 **4.44^{d}**	80 **3.19^{abcd}**
Share information about coyotes with other people	86 **5.22^{a}**	90 **4.68^{b}**	90 **5.03^{c}**	90 **4.88^{d}**	80 **3.46^{abcd}**
Avoid going to places where coyotes frequent	84 **5.23^{a}**	87 **4.40^{b}**	88 **4.91^{c}**	90 **4.54^{d}**	78 **3.42^{abcd}**
Emotional Response: (1=none of this feeling, 7=a lot of this feeling)	Family Gain	Community Gain	Family Loss	Community Loss	Control
Afraid	90 **2.54^{ad}**	91 **2.03^{def}**	95 **2.85^{be}**	94 **2.68^{cf}**	91 **1.91^{abc}**
Sad	87 **2.71^{a}**	91 **2.40^{d}**	94 **2.92^{bd}**	94 **2.87^{c}**	90 **2.12^{abc}**
Optimistic	89 **4.12^{a}**	90 **4.08^{b}**	94 **3.70^{c}**	94 **3.66^{d}**	91 **4.96^{abcd}**
Beliefs about Coyotes: (1=strongly disagree, 7=strongly agree)	Family Gain	Community Gain	Family Loss	Community Loss	Control
Timid	90 **4.38^{a}**	91 **4.26^{b}**	95 **4.01^{c}**	94 3.78	91 **3.36^{abc}**

*Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table 5. Means of dependent variables moderated by experience with coyotes in four message conditions, coyote food conditioning experiment.

	Saw coyotes	Family Gain Mean	Community Gain Mean	Family Loss Mean	Community Loss Mean
Keep bird and wildlife feeders out of coyotes' reach	Yes	**6.37^{ab}**	**5.36^{b}**	**5.40^{a}**	5.49
	No	5.41	5.09	**5.81^{a}**	**4.55^{a}**
Secure garbage and compost in animal-proof containers	Yes	**6.63^{ab}**	**5.76^{a}**	**5.06^{bc}**	**6.08^{c}**
	No	**5.98^{a}**	5.21	5.71	**5.14^{a}**
Remove all pet food from your yard	Yes	**6.52^{a}**	**4.58^{ab}**	5.42	**6.04^{b}**
	No	**5.90^{b}**	**5.04^{c}**	**6.23^{a}**	**4.60^{a}**
Report neighbors that are feeding coyotes	Yes	**6.12^{ab}**	**4.60^{b}**	**4.14^{ac}**	**5.40^{c}**
	No	4.80	4.92	4.91	4.64
Seek out more information about coyotes	Yes	**5.47^{ab}**	**4.02^{a}**	**4.19^{b}**	**4.2^{c}**
	No	3.67	3.50	4.23	3.56
Share information about coyotes with other people	Yes	**5.85^{a}**	**4.84^{a}**	5.03	5.51
	No	4.83	4.47	5.04	4.35
Avoid going to places where coyotes frequent	Yes	**5.38^{ab}**	**4.06^{a}**	**4.36^{b}**	4.57
	No	5.12	4.82	5.35	4.52

*Note: Rows with the same letter (a-a, b-b, c-c) are significantly different at $p < 0.05$, based on results of three-way ANOVAs.

Table 6. Means of dependent variables moderated by self-efficacy in four message conditions, coyote food conditioning experiment.

	Self - efficacy	Family Gain Mean	Community Gain Mean	Family Loss Mean	Community Loss Mean
Keep bird and wildlife feeders out of coyotes' reach	High	5.99	5.69	**6.31[a]**	**5.23[a]**
	Low	5.54	4.64	4.78	4.76
Report neighbors that are feeding coyotes	High	5.35	5.15	5.13	5.16
	Low	**5.41[ab]**	**4.15[a]**	**3.79[bc]**	**4.81[c]**
Ask neighbors to remove food that might attract coyotes	High	4.91	4.66	5.15	4.63
	Low	**4.93[ab]**	**3.79[a]**	**3.61[b]**	4.37

*Note: Rows with the same letter (a-a, b-b, c-c) are significantly different at $p < 0.05$, based on results of spotlight analyses.

Table 7. Means of dependent variables moderated by urban/rural residence, in gain versus loss frame conditions, coyote food conditioning experiment.

	County	Gain frames (Mean)	Loss frames (Mean)
Keep bird and wildlife feeders out of coyotes' reach	Rural	**6.14[a]**	**5.32[a]**
	Non-rural	5.60	5.71
Pick up leftovers if feeding pets outdoors	Rural	5.86	5.14
	Non-rural	**5.01[a]**	**6.09[a]**
Share information about coyotes with other people	Rural	**5.26[a]**	**4.69[a]**
	Non-rural	**4.58[a]**	**5.26[a]**

*Note: Rows with the same letter (a-a) are significantly different at $p < 0.05$, based on results of three-way ANOVAs.

4.4. Results of Black Bear Food Conditioning Experiment

Box 2. *Black bear food conditioning experiment –Key findings*

The main objective of this experiment was to learn how six message frames may influence intentions to engage in behaviors that prevent black bear food conditioning. We found that respondents exposed to any of the 6 messages (i.e., family-gain, community gain, family-loss, community-loss, bear gain, bear loss) exhibited higher intentions to take seven problem-prevention actions than respondents in the control group. Thus, all six messages seem to hold promise as frames for FWC messages to promote those problem-prevention behaviors. Results suggest that loss-frame messages will resonate with many people, but also may elevate bear-related fear and perceived risk. Gain frames offer comparable persuasive power without elevating fear or particular types of risk perceptions.

Supporting details:

- Intentions to engage in several key problem-prevention behaviors were higher among respondents who read loss-frame messages than among those who read gain-frame messages.
- Fear and perceived risk severity and susceptibility were higher among respondents who read the family-or community-referencing, loss-frame messages.
- At a practical level, all approaches other than the community-referencing, gain-frame message held similar persuasive power across a range of behavioral intentions.

4.4.1. Main and interaction effects of message conditions

4.4.1.1. Behavioral intentions related to black bear food conditioning

We asked respondents how likely they were to engage in 12 problem-prevention behaviors (Appendix E, Table E2). On 7 out of 12 behavioral intentions all the messages presented were associated with higher levels of behavioral intention than was observed in the control condition, indicating that all of the messages had some persuasive power related to those behaviors (Table E2, Table E3). Most respondents said they were unlikely to feed black bears or avoid information about bears, and none of the messages influenced intentions to engage in those behaviors (Table E2).

Several findings suggest that family-loss, community-loss, and bear-loss frames may be helpful in encouraging Floridians to take some bear-related problem-prevention behaviors. For example, we found that respondents exposed to loss-frame messages were more likely to seek out more information about black bears (M_L = 4.87, SD = 1.81; M_G = 4.48, SD = 1.93) than those exposed to the gain-frame messages ($p < 0.01$). On the other hand, other results suggest that using gain-frames and family-, community-, or bear-referencing messages would encourage multiple types of problem prevention behavior, as well (Table 8).

For three key behaviors (i.e., keeping bird feeders out of black bears' reach; securing garbage and compost; asking neighbors to secure garbage), we found that the community-referencing, gain-frame message was less persuasive than other message types (Table 8). Specifically the community-referencing, gain-frame message:

- elicited lower intention to keep bird feeders out of black bears' reach than the family-referencing, gain-frame message, the bear-referencing, gain-frame message, and the community-referencing, loss-frame message.
- elicited lower intention to secure garbage and compost in animal-proof containers than the bear-referencing, gain-frame message, and the community-referencing, loss-frame message.
- elicited lower intention to ask neighbors to secure trash so that it is not available to black bears than the bear-referencing, gain-frame message, and the community-referencing, loss-frame message.

4.4.1.2. Emotional responses

We found main effects of gain versus loss frame on fear, anger, sadness and optimism. Specifically, loss-frame messages induced more fear (M_G = 2.26, SD = 1.51; M_L = 2.64, SD = 1.61), more anger (M_G = 2.35, SD = 1.65; M_L = 2.70, SD = 1.77), more sadness (M_G = 2.87, SD = 1.80; M_L = 3.32, SD = 1.90) than gain-frame messages, whereas gain-frame messages induced more optimism than loss-frame messages (M_G = 4.47, SD = 1.71; M_L = 4.07, SD = 1.69), ($p < 0.05$). We also found a relationship between referencing points and sadness. Particularly, bear-referencing messages (M_B = 3.59, SD = 1.92; M_F = 2.81, SD = 1.79; M_C = 2.86, SD = 1.79) elicited more sadness than family-referencing and community-referencing messages. Additionally, when compared to the control condition, four message conditions (family-gain, community-gain, family-loss and community-loss) induced higher anger and sadness, two message conditions induced higher fear (family-loss and community-loss) and five message conditions (family-gain, community-gain, family-loss, community-loss, bear-loss) induced lower optimism (Table 8). No significant differences in feelings of guilt were observed between groups (Table E4).

4.4.1.3. Risk perception

We found significant interaction effects of message components on perceived risk *severity* (Table 8 and Table E5). Specifically, the family-loss message increased perceived risk to oneself and to other people in the community as compared to the bear-loss message. The community-

loss message increased perceived risk to oneself, to one's pets, and to other people in the community as compared to the community-gain message and the bear-loss message. In addition, the bear-gain message increased perceived risk to one's pets as compared to the community-gain message and increased perceived risk to other people in the community as compared to the family-gain message.

We also found significant interaction effects of message components on perceived risk *susceptibility* (Table 8 and Table E6). Specifically, the community-loss message increased perceived risk susceptibility of oneself, one's family, one's pets, other people and other people's pets as compared to the community-gain message and the bear-loss message. Furthermore, the family-loss message increased perceived risk susceptibility to oneself, one's family and other people's pets as compared to the bear-loss message. Moreover, the bear-gain message increased perceived risk susceptibility of one's family and other people compared to the community-gain message.

Analysis using our composite index of perceived risk *severity* (five items, not including perceived risk to one's pets) indicated that the family-loss message and the community-loss message elicited higher perceived risks as compared to the bear-loss message (Table E5). Analysis using our composite index of perceived risk *susceptibility* (five items, not including perceived risk susceptibility of one's pets) indicated that the community-loss message and the family-loss message increased perceived risk susceptibility compared to the bear-loss message; the community-loss message and the bear-gain message increased perceived risk susceptibility more than the community-gain message; the bear-gain message increased perceived risk susceptibility compared to the family-gain message (Table E6).

Moreover, when comparing the message conditions with the control condition, we found a somewhat consistent pattern that the family-loss message and the community-loss message elicited higher perceived risk severity and susceptibility than the no message condition. In all groups, respondents perceived relatively higher risk severity and susceptibility for black bears than for other groups.

4.4.1.4. Attitudes toward recommended behaviors

We asked respondents to indicate their attitudes toward the practice of keeping food out of reach of black bears as a way of preventing human-bear conflicts, using four semantic differential scales. A majority of respondents in all treatment groups agreed that keeping food and garbage out of the reach of black bears was effective, wise, valuable, and useful (Table E7). Agreement with these attitude statements was just as high in the control group as it was in the message treatment groups. We found no significant main or interaction effects of message components on attitudes toward recommended behaviors.

4.4.1.5. Beliefs about black bears

Respondents were asked to indicate agreement/disagreement with seven possible traits that black bears might possess (Table E8). We did not identify any significant main or interaction effects of

message components on beliefs about five black bear traits. We did find that, when compared with the control condition, four message conditions (family-loss, community-loss, bear-gain, bear-loss) made respondents more likely to think that black bears were timid, and all message conditions made respondents less likely to think that black bears were bold.

4.4.2. Message effects on segmented populations

Our analysis tested whether the six experimental messages produced different influences on the dependent variables examined in the previous section, when taking into account the different levels of 15 possible moderating variables. Seeing bears in the wild was found to be the only one of those variables that moderated behavioral intentions.

4.4.2.1. Moderating effects of having seen black bears in the wild

Significant interactions between behavioral intentions, seeing a bear, and message treatment are shown in Table 9. Overall the results indicate that family-loss messages resonated well with people who had seen a bear in the wild, and community-loss messages seemed to resonate more with people who did not have personal experiences with bears.

- For respondents who had seen black bears in the wild, the family-loss message was more persuasive than the:
    - family-gain or community-gain messages in encouraging respondents to keep feeders out of reach.
    - community-gain and bear-loss messages in encouraging readers to secure garbage and compost.
    - family-gain, community-gain, community-loss, and bear-loss frames in encouraging readers to ask neighbors to remove food attractants.
    - family-gain, community-loss, community-gain, and bear-loss frames in encouraging readers to ask neighbors to secure their trash.
    - family-gain, community-gain, and bear-loss frames in encouraging readers to seek out or share information on bears.

- For respondents who had not seen black bears in the wild, the community-loss message was more persuasive than the:
    - community-gain, bear-gain, or family-loss messages in encouraging readers to keep feeders out of reach.
    - community-gain, family-loss, family-gain, and bear-gain messages in encouraging readers to secure garbage and compost.
    - family-gain, family-loss, and community-gain messages in encouraging readers to ask neighbors to secure trash.
    - family-gain, community-gain, family-loss, and bear-gain frames in encouraging readers to seek out information about bears.

Table 8. Means of behavioral intentions, emotions, and risk perceptions that differed by experimental conditions in the black bear food conditioning experiment.

	Family gain	Community gain	Family loss	Community loss	Bear gain	Bear loss	Control
Behavioral Intentions: (1=very unlikely, 7=very likely)	N Mean	N Mean	N Mean	N Mean	N Mean	N Mean	N Mean
Keep bird and wildlife feeders out of black bears' reach	92 **5.40^{ag}**	97 **4.73^{bghijk}**	95 **5.56^{ch}**	83 **5.67^{di}**	94 **5.44^{ej}**	83 **5.36^{fk}**	78 **3.92^{abcdef}**
Secure garbage and compost in bear-proof containers	95 **5.20^{a}**	108 **4.87^{bgh}**	110 **5.48^{cg}**	93 **5.76^{dh}**	108 **5.40^{e}**	94 **5.28^{f}**	88 **3.97^{abcdef}**
Remove all pet food from your yard	56 **5.75^{a}**	79 **5.42^{b}**	75 **5.52^{c}**	65 **5.80^{d}**	64 **5.72^{e}**	57 **5.96^{f}**	63 **4.76^{abcdef}**
Report neighbors that are feeding black bears	97 **5.35^{a}**	107 **5.07^{bgh}**	106 **5.63^{cg}**	89 **5.43^{d}**	108 **5.62^{eh}**	98 **5.23^{f}**	85 **4.40^{abcdef}**
Ask neighbors to remove food that might attract black bears	95 **4.68^{a}**	109 **4.35^{fg}**	109 **4.90^{b}**	91 **5.05^{cf}**	109 **4.96^{dg}**	97 **4.88^{e}**	88 **3.81^{abcde}**
Ask neighbors to secure trash so that it is not available to black bears	93 **4.73^{a}**	108 **4.30^{bghij}**	107 **4.86^{cg}**	94 **5.17^{dh}**	111 **4.95^{ei}**	99 **4.88^{fj}**	93 **3.71^{abcdef}**
Seek out more information about black bears	107 **4.51^{agj}**	116 **4.38^{bhi}**	118 **4.89^{ch}**	100 **5.14^{dgijkl}**	119 **4.55^{ek}**	106 **4.59^{fl}**	106 **3.84^{abcdef}**
Share information about black bears with other people	105 **4.90^{a}**	114 **4.85^{b}**	119 **5.24^{c}**	97 **5.36^{d}**	118 **5.16^{e}**	107 **5.08^{f}**	98 **3.87^{abcdef}**
Avoid going to places where black bears frequent	104 4.93	111 **4.41^{bcd}**	110 **5.13^{b}**	99 **5.01^{c}**	108 **5.18^{ad}**	105 4.73	103 **4.60^{a}**

Table 8. (continued).

Emotional Response: (1=none of this feeling, 7=a lot of this feeling)	Family gain (N=115) Mean	Community gain (N=119) Mean	Family loss (N=122) Mean	Community loss (N=102) Mean	Bear gain (N=121) Mean	Bear loss (N=111) Mean	Control (N=121) Mean
Afraid	**2.23^{cd}**	**2.23^{ef}**	**2.73^{aceg}**	**2.71^{bdfh}**	**2.31^{gh}**	2.47	**2.15^{ab}**
Angry	**2.18^{efg}**	**2.17^{hijk}**	**2.79^{aeh}**	**2.62^{bi}**	**2.69^{cfj}**	**2.67^{dgk}**	**2.04^{abcd}**
Sad	**2.52^{efgh}**	**2.70^{ij}**	**3.08^{ael}**	**3.04^{bfm}**	**3.36^{cgik}**	**3.85^{dhjklm}**	**2.26^{abcd}**
Optimistic	**4.40^{a}**	**4.36^{b}**	**4.02^{cf}**	**4.02^{dg}**	**4.65^{fgh}**	**4.17^{eh}**	**4.99^{abcde}**
Perceived Risk Severity (1= not at all serious, 7= extremely serious)	(N=115) Mean	(N=119) Mean	(N=122) Mean	(N=102) Mean	(N=121) Mean	(N=111) Mean	(N=121) Mean
Perceived threat to oneself	2.96	**2.86^{ab}**	**3.40^{ac}**	**3.45^{bd}**	2.95	**2.65^{cd}**	2.94
Perceived threat to one's pets	**3.41^{c}**	**2.91^{adef}**	**3.65^{d}**	**4.06^{ceg}**	**3.49^{f}**	**3.18^{bg}**	**3.91^{ab}**
Perceived threat to other people in one's community	**2.96^{cd}**	**3.03^{ef}**	**3.69^{acegi}**	**3.82^{bdfhj}**	**3.06^{gh}**	**3.01^{ij}**	**3.12^{ab}**
Perceived threat to black bears if they frequent residential areas for food	**4.25^{c}**	**3.93^{def}**	**4.91^{acdg}**	**4.78^{be}**	**4.32^{g}**	**4.56^{f}**	**4.22^{ab}**
Perceived threat to other people's pets in your community	**3.24^{cd}**	**3.23^{ef}**	**3.84^{aceh}**	**3.89^{bdfgi}**	**3.33^{g}**	**3.23^{hi}**	**3.27^{ab}**

Table 8. (continued).

	Family gain	Community gain	Family loss	Community loss	Bear gain	Bear loss	Control
Perceived Risk Susceptibility (1= very unlikely, 7= very likely)	(N=115) Mean	(N=119) Mean	(N=122) Mean	(N=102) Mean	(N=121) Mean	(N=111) Mean	(N=121) Mean
Likelihood that bear will harm oneself	**2.54^{c}**	**2.28^{de}**	**2.99^{adf}**	**3.13^{bceg}**	2.72	**2.37^{fg}**	**2.44^{ab}**
Likelihood that bear will harm one's family	**2.45^{b}**	**2.27^{cde}**	**2.92^{cf}**	**3.12^{abdg}**	**2.78^{e}**	**2.41^{fg}**	**2.48^{a}**
Likelihood that bear will harm one's pets	3.11	**2.64^{ab}**	3.01	**3.45^{bc}**	3.05	**2.68^{c}**	**3.15^{a}**
Likelihood that bear will harm other people in one's community	**2.83^{c}**	**2.50^{def}**	**3.30^{ad}**	**3.45^{bceg}**	**3.12^{f}**	**2.87^{g}**	**2.65^{ab}**
Likelihood of harm to bears who frequent residential areas	4.36	4.18	**4.69^{a}**	**4.56^{b}**	**4.55^{c}**	**4.70^{d}**	**3.88^{abcd}**
Likelihood that bear will harm pets of other people in one's community	3.42	**3.03^{cd}**	**3.80^{ace}**	**3.91^{bdf}**	3.49	**3.24^{ef}**	**3.04^{ab}**
Beliefs about Black Bears: (1=strongly disagree, 7=strongly agree)	(N=115) Mean	(N=119) Mean	(N=122) Mean	(N=102) Mean	(N=121) Mean	(N=111) Mean	(N=121) Mean
Timid	4.28	**4.51^{a}**	**4.48^{b}**	**4.55^{c}**	**4.35^{d}**	4.23	**3.91^{abcd}**
Bold	**4.61^{a}**	**4.79^{b}**	**4.87^{c}**	**4.82^{d}**	**4.92^{eg}**	**4.49^{fg}**	**5.38^{abcdef}**

*Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f, g-g, h-h, i-i, j-j, k-k, l-l, m-m) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table 9. Means of dependent variables moderated by experience with black bears in six message conditions for the black bear food conditioning experiment.

		Family gain	Community gain	Family loss	Community loss	Bear gain	Bear loss
	Saw black bears	Mean	Mean	Mean	Mean	Mean	Mean
Keep bird and wildlife feeders out of black bears' reach	Yes	**5.44^{a}**	**4.84^{bc}**	**6.58^{ac}**	5.60	**6.06^{b}**	5.24
	No	5.36	**4.64^{ad}**	**4.82^{b}**	**5.74^{abc}**	**4.78^{c}**	**5.46^{d}**
Secure garbage and compost in animal-proof containers	Yes	5.38	**5.18^{b}**	**6.00^{ab}**	5.38	5.77	**5.08^{a}**
	No	**5.02^{c}**	**4.61^{ad}**	**5.12^{b}**	**6.08^{abce}**	**5.05^{e}**	**5.43^{d}**
Ask neighbors to remove food that might attract black bears	Yes	**4.88^{a}**	**4.22^{de}**	**6.07^{abce}**	**4.91^{b}**	**5.44^{d}**	**4.76^{c}**
	No	4.47	4.46	**4.11^{ab}**	**5.19^{a}**	4.53	**4.96^{b}**
Ask neighbors to secure trash so that it is not available to black bears	Yes	**5.09^{a}**	**4.51^{de}**	**5.96^{abce}**	**5.04^{b}**	**5.36^{d}**	**4.58^{c}**
	No	**4.37^{d}**	**4.12^{ae}**	**4.10^{bc}**	**5.29^{abd}**	4.59	**5.11^{ce}**
Seek out more information about black bears	Yes	**4.77^{a}**	**4.54^{c}**	**5.76^{abc}**	5.20	5.06	**4.48^{b}**
	No	**4.27^{c}**	**4.25^{a}**	**4.33^{b}**	**5.09^{abcd}**	**4.14^{d}**	4.68
Share information about black bears with other people	Yes	**5.14^{a}**	**5.17^{c}**	**6.15^{abc}**	5.47	5.56	**4.96^{b}**
	No	4.67	**4.58^{a}**	4.67	**5.28^{a}**	4.83	5.18

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e) are significantly different at $p < 0.05$, based on results of three-way ANOVAs.

4.5. Results of Coyote/Pet Safety Experiment

Box 4. *Coyote/pet safety messages –Key findings*

The main objective of this experiment was to learn how four message frames may influence intentions to take actions that improve pet (especially cat) safety in areas with coyotes. We found that respondents exposed to any of the four messages (i.e., individual gain, community gain, individual loss, community-loss) exhibited higher intentions to seek out or share information about coyotes and pet safety actions than respondents in the control group. Thus, all four message frames seem to hold promise for FWC messages to promote those problem-prevention behaviors. Several findings suggested that individual exemplars may be helpful in encouraging information-seeking and sharing behavior, but also may elevate risk perceptions and fear.

Supporting details:

- Intentions to take a few problem-prevention behaviors were higher among respondents who read individual exemplar messages than among those who read community exemplar messages.
- Message effects differed among respondents with high versus low self-efficacy. For respondents with low self-efficacy, the individual exemplar, loss-frame message was more persuasive in promoting recommended behaviors than the community exemplar, loss-frame message. For respondents with high self-efficacy, the individual exemplar, gain-frame message and the community exemplar, loss-frame message were more persuasive in promoting recommended behaviors than the community exemplar, gain-frame message.

4.5.1. Main and Interaction Effects of Message Conditions

4.5.1.1. Behavioral Intentions Related to Coyote Cat Safety

We asked respondents how likely they were to engage in 13 problem-prevention behaviors (Appendix F, Table F2, Table F3). For our analysis, if the questions involved pet-related behavioral intentions, we included only those who indicated they had pets. Similarly, if the questions were related to cats or dogs, we included only those who indicated they had cats or dogs.

We found significant main effects of individual vs. community exemplars on intentions to tell other people to supervise their pets when outside, share information about coyotes with other people, and kill coyotes (Table 10). Respondents exposed to individual exemplar messages

were more likely to engage in these three behaviors than respondents exposed to the community exemplar messages ($p<0.05$).

When compared with the control condition, all messages induced higher intentions to seek and share information about coyotes (Table 10). The two individual exemplar messages also induced higher intentions to tell other people to supervise their pets and kill coyotes.

4.5.1.2. Emotional Responses

We found main effects of the gain versus loss frame on anger and sadness. Specifically, loss-frame messages induced more anger and sadness than gain-frame messages ($p < 0.01$). We also found main effects of individual vs. community exemplar on fear, anger and sadness. Particularly, individual exemplar messages elicited more fear, anger and sadness than community exemplar messages ($p<0.05$). Additionally, there was a significant interaction effect of message components on sadness. The individual exemplar/loss message induced higher sadness than the individual exemplar/gain message and the community exemplar/loss message ($p < 0.001$). In addition, when compared with the control condition, most, if not all messages, induced higher fear, anger and sadness, and lower optimism ($p<0.05$) (Table F4).

4.5.1.3. Risk Perception

We found no significant main or interaction effects of message components on perceived risk severity or perceived susceptibility. Moreover, when compared with the control condition, all messages made respondents think that the risks to other people's pets were more severe and other people's pets were more susceptible to coyote risks ($p < 0.05$) (Table F5).

4.5.1.4. Attitudes toward Recommended Behaviors

Using 4 semantic differential scales and one general attitude scale, we asked respondents to indicate their attitudes toward the practice of keeping cats indoors as a way of preventing coyote-cat conflicts. A majority of respondents in all treatment groups agreed that keeping cats indoors was an effective, wise, valuable, and useful way to prevent coyote-cat conflicts. We did not identify any significant main or interaction effects of message components on attitudes toward recommended behaviors. In addition, agreement with these attitude statements was just as high in the control group as it was in the message treatment groups (Table F6).

4.5.1.5. Beliefs about Coyotes

Respondents were asked to indicate agreement/disagreement with seven possible traits that coyotes might possess (Table F7). We found a significant main effect of individual vs. community exemplar on perceived timidity of coyotes; individual exemplar messages made respondents perceive coyotes as more timid ($p<0.05$). When compared with the control condition, all messages resulted in respondents perceiving coyotes as more common ($p<0.05$).

4.5.2. Message Effects on Segmented Populations

Our analysis tested if the four experimental messages produced different influences on the dependent variables examined in the previous section, when taking into account the different levels of 15 possible moderating variables. We found that two variables (self-efficacy and length of residence in Florida) were moderators of behavioral intentions.

4.5.2.1. Moderating Effects of Self-efficacy

We asked respondents to indicate their perceived self-efficacy in keeping pets under control when outdoors (7-point scale) and included this variable in regression models for our analysis. We used spotlight analyses and compared respondents at 1 standard deviation below the mean self-efficacy (4.16, referred to as low self-efficacy) with respondents at one standard deviation above the mean self-efficacy (5.64, referred to as high self-efficacy). In Table 11, we include only significant 3-way interaction results. We found a number of significant results. In order to describe the patterns more broadly, we used the same 8-item composite scale used in the previous section.

The results of a regression model on this composite scale indicate that for respondents with low self-efficacy, the individual exemplar, loss-frame message was more persuasive in promoting recommended behaviors than the community exemplar, loss-frame message. In contrast, for respondents with high self-efficacy, the individual exemplar, gain-frame message and the community exemplar, loss-frame message were more persuasive in promoting recommended behaviors than the community exemplar, gain-frame message.

4.5.2.2 Moderating Effects of the Length of Residence in Florida

We asked respondents to indicate how long they have been living in Florida and included this variable in regression models for our analysis. We used spotlight analyses and compared respondents at 1 standard deviation below the mean length of residence in Florida (about seven years, referred to as relatively short-time residents) with respondents at one standard deviation above the mean length of residence in Florida (about 37 years, referred to as relatively long-time residents). In Table 12, we include only significant 3-way interaction results. We found a number of significant results. In general, the community exemplar, gain-frame message was least persuasive for people who had lived in Florida for a relatively long time, whereas the community exemplar, loss-frame message was least persuasive for people who had lived in Florida for a relatively short time.

Table 10. Means of behavioral intentions, emotions, and risk perceptions that differed by message conditions in the coyote/pet safety experiment.

	Individual gain	Community gain	Individual loss	Community loss	Control
Behavioral Intentions: (1=very unlikely, 7=very likely)	N Mean	N Mean	N Mean	N Mean	N Mean
Tell other people to supervise their pets when outside	88 **5.69**^{acd}	79 **4.65**^{ce}	87 **5.57**^{be}	88 **5.00**^{d}	91 **4.49**^{ab}
Seek out more information about coyotes	89 **4.39**^{ae}	79 **3.71**^{be}	83 **3.94**^{c}	88 **3.82**^{d}	84 **2.98**^{abcd}
Share information about coyotes with other people	88 **5.19**^{ae}	79 **4.56**^{bef}	82 **5.22**^{cf}	88 **4.75**^{d}	83 **3.33**^{abcd}
Kill coyotes	80 **2.21**^{acd}	79 **1.61**^{ce}	72 **2.19**^{bef}	82 **1.62**^{df}	81 **1.46**^{ab}
Emotional Responses: (1=none of this feeling, 7=a lot of this feeling)	(N=95) Mean	(N=85) Mean	(N=85) Mean	(N=91) Mean	(N=95) Mean
Afraid	**3.08**^{ad}	**2.93**^{b}	**3.17**^{ce}	**2.44**^{de}	**2.09**^{abc}
Angry	**2.46**^{ad}	**2.31**^{e}	**3.28**^{bdef}	**2.44**^{cf}	**1.93**^{abc}
Sad	**3.55**^{ae}	**3.31**^{bf}	**4.68**^{cefg}	**3.53**^{dg}	**2.26**^{abcd}
Optimistic	**3.96**^{a}	**3.68**^{b}	**3.53**^{c}	**3.47**^{d}	**4.59**^{abcd}
Perceived Risk Severity : (1= not at all serious, 7=very serious)	(N=95) Mean	(N=85) Mean	(N=85) Mean	(N=91) Mean	(N=95) Mean
How serious is the threat to other people's pets posed by coyotes?	**4.60**^{a}	**4.51**^{b}	**4.68**^{c}	**4.51**^{d}	**3.56**^{abcd}
Perceived Risk Susceptibility: (1=not likely, 7=very likely)	(N=95) Mean	(N=85) Mean	(N=85) Mean	(N=91) Mean	(N=95) Mean
Other people's pets will be harmed by coyotes in the county where I live.	**4.00**^{a}	**3.69**^{b}	**4.15**^{c}	**3.78**^{d}	**2.97**^{abcd}
Beliefs about coyotes: (1=strongly disagree, 7=strongly agree)	(N=95) Mean	(N=85) Mean	(N=85) Mean	(N=91) Mean	(N=95) Mean
Common	**4.58**^{a}	**4.26**^{b}	**4.42**^{c}	**4.31**^{d}	**3.78**^{abcd}

Table 11. Means of dependent variables moderated by self-efficacy in four message conditions, coyote/pet safety experiment.

	Self-efficacy	Individual gain Mean	Community gain Mean	Individual loss Mean	Community loss Mean
Keep pets under control when outside	High	6.65	6.59	6.23	6.81
	Low	**5.69^{a}**	5.84	**6.54^{a}**	5.81
Prevent pets from roaming freely outside	High	**6.66^{ab}**	**5.48^{a}**	**5.40^{b}**	6.13
	Low	**5.45^{a}**	**5.76^{c}**	**6.64^{abc}**	**5.14^{b}**
Avoid going to places where coyotes may be	High	**5.53^{ab}**	**3.98^{ac}**	**4.33^{b}**	**5.38^{c}**
	Low	4.51	4.38	4.80	4.44

*Note: Rows with the same letter (a-a, b-b, c-c) are significantly different at $p < 0.05$, based on results of spotlight analyses.

Table 12. Means of dependent variables moderated by years of residence in Florida, in four message conditions, coyote/pet safety experiment.

	Years of residence	Individual gain Mean	Community gain Mean	Individual loss Mean	Community loss Mean
Walk dogs on leashes	<7	**6.81^{ab}**	**5.77^{ac}**	**6.04^{b}**	**6.61^{c}**
	>37	6.02	6.44	6.44	6.54
Tell other people to supervise their pets when outside	<7	**5.99^{abc}**	**4.62^{a}**	**5.08^{b}**	**5.09^{c}**
	>37	5.39	**4.67^{b}**	**6.17^{ab}**	**4.93^{a}**
Seek out more information about coyotes	<7	**4.57^{ab}**	**3.54^{a}**	**3.54^{b}**	4.00
	>37	4.22	3.91	4.42	3.68
Share information about coyotes with other people	<7	**5.36^{a}**	**4.29^{a}**	4.75	4.90
	>37	5.02	**4.85^{b}**	**5.78^{ab}**	**4.64^{a}**

*Note: Rows with the same letter (a-a, b-b, c-c) are significantly different at $p < 0.05$, based on results of spotlight analyses.

4.6. Lionfish Messages

Box 3. *Lionfish experiment –Key findings*

The main objective of this experiment was to learn how four message frames may influence perceived importance of the lionfish invasion in Florida. We found that respondents exposed to any of the four messages (general economic, specific economic, general ecological, specific ecological) were more likely than the control group to agree that the lionfish issue is important, of personal interest, and necessary to address. Any of the messages elevated concern about marine ecosystems and intentions to become engaged in the issue. These results suggest that all four of the tested approaches hold promise as frames for FWC messages to promote recognition of the lionfish invasion as an important public issue.

Supporting details:

- Respondents exposed to messages were more likely than the control group to:
    - strongly agree that the lionfish issue is important and of interest to them.
    - express intentions to seek out or share information about lionfish, donate to lionfish-related organizations, and support legislation that addresses the lionfish issue.
    - perceive lionfish as a threat to Florida's marine ecology and economy.
    - express high concern about Florida's marine ecosystems.

4.6.1. Main and Interaction Effects of Message Conditions

4.6.1.1 Behavioral Intentions Related to Lionfish Messages

We asked respondents how likely they were to engage in nine problem-prevention behaviors (Appendix G, Table G2, Table G3). Three items pertained to behaviors that might be taken by scuba divers and spear fishers. Few respondents were divers and spear fishers, so those three items were dropped from our analysis.

On four out of six behavioral intentions all the messages presented were associated with higher levels of behavioral intention than was observed in the control condition, indicating that all of the messages had some power to persuade respondents to seek out or share information about lionfish, donate to organizations who address the lionfish issue, or support legislation that helps address the lionfish issue (Table 13). All four message types were more persuasive than the control condition, but none were statistically stronger than the others (i.e., we identified no significant main effects or interaction effects of message components on those four behavioral intentions).

4.6.1.1 Emotional Responses

We found no significant main effects or interaction effects of message components on anxiety, anger, sadness or optimism (i.e., none of the messages was more likely than the others to elicit those emotions) (Table G4). When compared to the control condition, however, all message conditions induced higher anxiety, anger and sadness, and lower optimism (Table G4).

4.6.1.2 Risk Perception

Respondents perceived that lionfish posed a greater threat to Florida's marine ecology than they posed to them personally or to Floridians generally. Exposure to messaging elevated perceived risks to the ecology, economy, and Floridians (Table 13).

Respondents who read economic messages perceived greater risk to Florida's economy and Florida's residents than did respondents who read the general ecological message. We found few other differences in risk perceptions based on exposure to ecological vs. economic messages (Table 13, Table G5, Table G6). Our primary finding was that all four message conditions typically led respondents to perceive higher risk to Florida's marine ecology, economy, and residents than the control condition.

4.6.1.4 Attitudes toward Addressing the Lionfish Issue

We used semantic-differential scales to assess respondents' attitudes toward addressing the lionfish issue. Those who read any of the messages were more likely than members of the control group to believe that addressing the lionfish issue was important, necessary, and a good use of time and money (Table 13). All of the messages were equally effective in eliciting more favorable attitudes toward addressing the lionfish issue (i.e., we found no statistical differences in mean scores across the 4 treatment groups on these items) (Table G7).

4.3.3.5 Beliefs about Lionfish

Respondents were asked to indicate agreement/disagreement with 11 possible traits that lionfish might possess (Table G8). When compared with the control condition, respondents in most or all of the message conditions were more likely to agree that lionfish are invasive, predatory, a nuisance, rapidly reproducing, and voracious consumers of other fish (Table 13). They also were less likely to agree that lionfish are venomous and beautiful.

We found significant main effects of general vs. specific frames on 6 of the 11 traits. Respondents exposed to the specific frames were more likely than respondents exposed to general frames to agree that lionfish are predatory, venomous, common, intimidating, rapidly reproducing, and dangerous. In addition, we also found a main effect of ecological vs. economic frames on one trait: respondents who read messages emphasizing the ecological impacts of lionfish were more likely to think that lionfish eats large amounts of other fish than those who read the economic impact messages.

4.6.1.6 Issue Salience

Respondents were asked to indicate whether they agreed that the lionfish issue was important, relevant and of interest to them (Table G9). Respondents perceived the lionfish issue as more relevant to them after reading the specific economy message than the specific ecology message. No other significant main or interaction effects were found.

When compared with the control condition, respondents who read any of the four messages were more likely to agree that the lionfish issue was important and of interest to them. Respondents who read the general ecology message and the specific economy message were more likely than the control group to agree that the lionfish issue was relevant (Table 13).

4.6.1.7 Perceived Responsibility

Respondents were asked to indicate how much responsibility FWC, divers, commercial fishermen, NGOs and citizens should have for addressing the lionfish issue (Table G10). Respondents who read any of the four messages were more likely than the control group to respond that commercial fishermen and divers should take responsibility for addressing the lionfish issue. Respondents who read the ecology messages or the specific economy message were more likely than the control group to respond that FWC and non-governmental organizations should take responsibility for addressing the lionfish issue (Table 13).

4.6.1.8 Concerns for impacts on people, marine life, and the economy

Respondents were asked to indicate how concerned and worried they were about the threats lionfish might pose to fairy basslets in Florida[1], Florida's lobster fishermen, Florida's economy and marine ecosystems in Florida (

Table G11). We discovered similar patterns for concern and worry and for the purpose of simplicity, they were treated as one concept in the following text.

We found that the specific frames induced more concern and worry for marine ecosystems than the general frames. As one might predict, the economic frames induced more concern for Florida's economy than the ecological frames. Furthermore, the specific, ecological message, as compared to the general, ecological message and the specific, economic message, induced more concern for fairy basslets. The general, ecological message (as compared to the general, economic message), and the specific, economic message (as compared to the general,

[1] The fairy basslet (*Gramma loreto*) is a small, colorful species native to the carribean. They have become a common prey item for lionfish, and are vulnerable to local extinction because they live in small local populations. Researchers at Oregon State University (OSU) (M. S. Webster and M. A. Hixon) constructed experiments to measure mortality of fairy basslets on artificial reefs with and without lionfish presence. They found that predation rates were four times higher on the reefs with lionfish, in comparison to reefs with native predators only. This experiment, which showed a propensity of lionfish to continue hunting at very low prey densities, raises concerns about potential extirpation of small reef fish in areas colonized by lionfish. Given the results of the OSU experiment, we believed fairy basslet were a good candidate around which to develop a specific ecological-effect scenario for message testing.

economic message and the specific, ecological message) induced more concern for Florida's lobster fishermen.

We also created a composite scale using all eight items. The general concern and worry scale indicated that when exposed to specific frames, respondents showed more overall concern and worry than when exposed to general frames. When compared with the control condition, the specific, ecological message and the specific, economic message induced more overall concern and worry.

4.6.2. Message Effects on Segmented Populations

Our analysis tested if the four experimental messages produced different influences on the dependent variables examined in the previous section, when taking into account the different levels of 15 possible moderating variables. Age was the only variable that had a moderating influence.

4.6.2.1. Moderating Effects of Age

We asked respondents' age and included this continuous variable in regression models for our analysis. In Table 14, we include only significant 3-way interaction results. We found a number of significant results. In order to describe the patterns more broadly, we used composite scales for perceived risk severity (all risk severity items combined), risk susceptibility (all risk susceptibility items combined), attitude toward addressing the lionfish issue (all attitude items combined), and overall concern and worry for those impacted by lionfish (all concern and worry items combined). We used spotlight analyses and compared respondents at one standard deviation below the mean age (about 30 years old, referred to as younger respondents in the following text) with respondents at one standard deviation above the mean age (about 66 years old, referred to as older respondents in the following text).

For younger respondents, the specific, ecological message induced more overall concern and worry, and higher general perceived risk susceptibility, than the general, ecological message. For older respondents, the general, ecological message induced more favorable attitude toward addressing the lionfish issue, higher perceived risk severity than the specific, ecological message, and more overall concern and worry than the general economic message. In addition, for older respondents, the specific, economic message induced higher perceived risk severity, high perceived risk susceptibility and more favorable attitudes toward addressing the lionfish issue than the specific, ecological message, and more overall concern and worry than the general, economic message.

Table 13. Means of behavioral intentions, attitudes, beliefs, and risk perceptions that differed by message conditions, lionfish message experiment.

	Ecology message		Economy message		
	General	Specific	General	Specific	Control
Behavioral Intentions: (1=very unlikely,7=very likely)	(N=157) Mean	(N=160) Mean	(N=167) Mean	(N=164) Mean	(N=156) Mean
Seek out more information about lionfish	**4.59[a]**	**4.46[b]**	**4.59[c]**	**4.47[d]**	**3.69[abcd]**
Share information about lionfish with other people	**4.85[a]**	**4.84[b]**	**5.05[c]**	**4.82[d]**	**3.47[abcd]**
Donate to organizations whose mission is to address the lionfish issue	**3.87[a]**	**3.73[b]**	**3.77[c]**	**3.71[d]**	**2.80[abcd]**
Support legislation that helps to address the lionfish issue	**5.05[a]**	**4.89[b]**	**4.97[c]**	**4.98[d]**	**3.81[abcd]**
Emotional Responses: (1=none of this feeling, 7=a lot of this feeling)	Mean	Mean	Mean	Mean	Mean
Anxious	**3.54[a]**	**3.45[b]**	**3.31[c]**	**3.43[d]**	**2.68[abcd]**
Angry	**3.63[a]**	**3.61[b]**	**3.50[c]**	**3.72[d]**	**1.86[abcd]**
Sad	**4.07[a]**	**4.30[b]**	**3.89[c]**	**4.17[d]**	**2.08[abcd]**
Optimistic	**3.77[a]**	**3.73[b]**	**3.77[c]**	**3.53[d]**	**4.99[abcd]**
Perceived Risk Severity: (1= not at all serious, 7= extremely serious)	Mean	Mean	Mean	Mean	Mean
How serious is the threat to Florida's marine ecology posed by lionfish?	**5.40[a]**	**5.44[b]**	**5.26[c]**	**5.60[d]**	**4.35[abcd]**
How serious is the threat to Florida's economy posed by lionfish?	**4.79[a]**	**4.83[b]**	**4.87[c]**	**5.08[d]**	**3.84[abcd]**
How serious is the threat to Floridians posed by lionfish?	**4.38[a]**	**4.41[b]**	**4.47[c]**	**4.55[d]**	**3.66[abcd]**
How serious is the threat to you personally posed by lionfish?	**3.48[a]**	**3.32[b]**	**3.30[c]**	3.18	**2.88[abc]**
Composite Scale	**4.51[a]**	**4.50[b]**	**4.48[c]**	**4.60[d]**	**3.68[abcd]**

Table 13. (continued).

	Ecology message		Economy message		
	General	Specific	General	Specific	Control
Perceived Risk Susceptibility:	(N=157)	(N=160)	(N=167)	(N=164)	(N=156)
(1= very unlikely, 7= very likely)	Mean	Mean	Mean	Mean	Mean
Likelihood that Florida's marine ecology will be harmed by lionfish	**5.32^{a}**	**5.35^{b}**	**5.30^{c}**	**5.53^{d}**	**4.35^{abcd}**
Likelihood that Florida's economy will be harmed by lionfish	**4.52^{ae}**	**4.63^{bf}**	**4.83^{c}**	**5.09^{def}**	**3.78^{abcd}**
Likelihood that Floridians will be harmed by lionfish	**3.85^{d}**	**4.06^{a}**	**4.16^{b}**	**4.36^{cd}**	**3.45^{abc}**
Likelihood that you will be harmed by lionfish	2.91	**3.02^{a}**	**3.13^{b}**	**2.97^{c}**	**2.58^{abc}**
Composite Scale	**4.51^{ae}**	**4.50^{b}**	**4.48^{c}**	**4.60^{de}**	**3.68^{abcd}**
Attitudes:					
(semantic differential 1-7))	Mean	Mean	Mean	Mean	Mean
Unimportant (1) – Important (7)	**5.51^{a}**	**5.46^{b}**	**5.35^{c}**	**5.54^{d}**	**4.76^{abcd}**
Unnecessary (1) – Necessary (7)	**5.49^{a}**	**5.36^{b}**	**5.45^{c}**	**5.49^{d}**	**4.86^{abcd}**
Poor use of time and money (1) – Good use of time and money (7)	**5.20^{a}**	**5.11^{b}**	**5.17^{c}**	**5.20^{d}**	**4.67^{abcd}**
Composite Scale (1-7)	**5.40^{a}**	**5.31^{b}**	**5.33^{c}**	**5.41^{d}**	**4.76^{abcd}**
Beliefs about Lionfish: (1=strongly disagree, 7=strongly agree)	Mean	Mean	Mean	Mean	Mean
Invasive	**5.59^{a}**	**5.70^{b}**	**5.62^{c}**	**5.92^{d}**	**5.17^{abcd}**
Predatory	5.47	**5.76^{ac}**	**5.29^{cd}**	**5.63^{bd}**	**5.28^{ab}**
Venomous	**4.19^{ae}**	**4.54^{b}**	**4.52^{c}**	**4.74^{de}**	**5.13^{abcd}**
Common	**4.18^{ab}**	**4.71^{ac}**	**4.18^{cd}**	**4.70^{bd}**	4.42
Nuisance	5.38	**5.66^{a}**	**5.43^{b}**	**5.60^{c}**	**5.06^{abc}**
Intimidating	**4.59^{ab}**	**5.09^{ac}**	**4.60^{cd}**	**4.96^{bd}**	4.87
Reproducing rapidly	**5.26^{c}**	**5.54^{ad}**	**5.16^{de}**	**5.71^{bce}**	**5.01^{ab}**
Eating large amounts of other fish	**5.62^{ad}**	**5.64^{be}**	**5.23^{de}**	**5.41^{c}**	**4.98^{abc}**
Beautiful	**4.23^{a}**	**4.08^{bd}**	**4.29^{c}**	**4.48^{d}**	**4.69^{abc}**

Table 13. (continued).

	Ecology message		Economy message		
	General	Specific	General	Specific	Control
Issue Salience: (1=disagree strongly, 7=agree strongly) To me, the lionfish issue is…	(N=157) Mean	(N=160) Mean	(N=167) Mean	(N=164) Mean	(N=156) Mean
Important	**5.63[a]**	**5.61[b]**	**5.60[c]**	**5.67[d]**	**4.62[abcd]**
Relevant	**5.43[a]**	5.09	5.26	**5.48[b]**	**4.87[ab]**
Of interest	**5.32[a]**	**5.39[b]**	**5.37[c]**	**5.37[d]**	**4.53[abcd]**
Perceived responsibility: How much responsibility should the following have? (1=hardly any, 7=a great deal)	Mean	Mean	Mean	Mean	Mean
Florida Fish and Wildlife Conservation Commission (FWC)	**5.69[a]**	**5.80[b]**	5.59	**5.88[c]**	**5.27[abc]**
Non-governmental organizations and groups	**4.98[a]**	**5.02[b]**	4.73	**4.98[c]**	**4.53[abc]**
Commercial fishermen	**5.12[a]**	**5.13[b]**	**5.10[c]**	**5.39[d]**	**4.72[abcd]**
Divers	**4.91[a]**	**4.83[b]**	**4.75[c]**	**4.71[d]**	**4.33[abcd]**
Economic and ecological concerns (1=not at all concerned, 7=very concerned)	Mean	Mean	Mean	Mean	Mean
Florida's marine ecosystems	**5.32[a]**	**5.51[b]**	**5.23[c]**	**5.56[d]**	**4.67[abcd]**
Fairy basslets in Florida	**3.88[b]**	**5.16[abcd]**	**3.72[c]**	**3.90[d]**	**3.97[a]**
Florida's economy	**4.71[d]**	**4.86[a]**	**4.92[b]**	**5.20[cd]**	**4.33[abc]**
Florida's lobster fishermen	**4.51[bc]**	**4.63[de]**	**4.00[bdf]**	**5.31[acef]**	**4.24[a]**
Composite Scale	**4.57[cd]**	**4.97[ace]**	**4.46[ef]**	**4.96[bdf]**	**4.26[ab]**

*Note: Rows with the same letter (a-a, b-b, c-c, d-d) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table 14. Means of dependent variables moderated by age in message four message conditions, lionfish message experiment.

		Ecology general	Ecology specific	Economy general	Economy specific
		Mean	Mean	Mean	Mean
Perceived Risk Severity Composite	Young	4.14	4.52	4.36	4.30
	Old	**4.97^{a}**	**4.48^{ab}**	4.58	**4.93^{b}**
Perceived Risk Susceptibility Composite	Young	**3.79^{a}**	**4.32^{a}**	4.21	4.24
	Old	4.58	**4.48^{a}**	4.22	**4.75^{a}**
Attitude toward Addressing the Lionfish Issue Composite	Young	4.88	5.16	4.95	4.85
	Old	**6.04^{a}**	**5.43^{ab}**	5.66	**6.02^{b}**
Overall Concern and Worry Composite	Young	**4.26^{a}**	**4.92^{a}**	4.49	4.65
	Old	**4.96^{a}**	**5.01^{c}**	**4.43^{abc}**	**5.30^{b}**

*Note: Rows with the same letter (a-a, b-b) are significantly different at $p < 0.05$, based on results of spotlight analyses.

5. DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

In summary, each of the message frames we tested proved to have power to persuade respondents to express intentions to take problem-prevention actions (coyote and black bear experiments) or to influence perceptions about issue importance (lionfish experiment). Taken as a whole, findings from these experiments indicate that the message frames we tested show promise for applications to communication about conflict species in Florida. Minimally, FWC has empirical evidence that these framing approaches warrant consideration as the foundation for communication about problem interactions with coyote, black bear, and lionfish. Specific conclusions and implications are discussed in the following sections.

5.1. Messaging to Encourage Problem Prevention Actions (Coyote and Bear)

We tested both gain and loss messages because previous research had shown that both have been persuasive in other, diverse communication contexts (Rothman & Salovey, 1997; Rothman et al., 2006; O'Keefe & Jenson, 2006). Our findings confirm that both gain and loss messages can exert persuasive power on intentions to take actions that prevent coyote and black bear food conditioning, leading us to conclude that both should receive additional consideration for use in FWC messaging about preventing problems with coyotes and bears.

Previous research in non-wildlife contexts has shown that loss messages and individual exemplars have persuasive power for some audiences, but using loss messages can have the collateral effect of elevating fear or risk perceptions (Rothman & Salovey, 1997). Our findings demonstrate that those phenomena are also likely to occur in the context of communication about human-wildlife conflicts. One implication of these findings is that FWC staff should carefully consider when to use loss messages, and with whom, because such messages have potential to produce undesirable collateral effects. Using a loss frame with an individual exemplar may be useful when communicating with audiences that have unrealistically-low risk perceptions. If elevating risk perceptions is not an objective, gain frames may be a more prudent choice.

Findings from Task 1 of this project (Siemer et al. 2014) demonstrated that black bear-related newspaper articles between 2011 and 2013 often contained content about negative impacts that people can have on bears. Concern about individual bears, such as potential for problem bears to be euthanized, were common themes in newspaper articles. We tested bear-gain and bear-loss frames in this study because our newspaper content analysis led to a hypothesis that concern about bear welfare is common in Florida and may move people to take problem-prevention actions. As anticipated, we found that bear-gain and bear-loss messages did have power to persuade readers to take actions that will prevent black bear food conditioning (those results were consistent with other findings showing that respondents perceived greater risks to bears than to people or their pets). This finding implies that it would be useful for FWC to consider using explicit bear-gain and bear-loss elements in their problem-prevention messages. Such messages should be part of a comprehensive communication approach to ensure that problem-prevention messages are consistent with messaging about black bear conservation and population management.

Research on a variety of human-wildlife conflict issues has shown that personal experience with the referent species exerts an influence on one's intuitive judgments about risks (i.e., their risk perceptions) related to that species (Loker et al, 1999; Siemer et al., 2009). Though not a specific focus of this study, we observed evidence of that phenomenon in the coyote and black bear message experiments. As people gain personal experience, they may adjust their perceptions of likelihood and consequences of an encounter (e.g., seeing coyotes occasionally may make such encounters feel less threatening; seeing black bears in the neighborhood may lead to a belief that the chances of a negative encounter with a bear are increasing). To be most effective, FWC should consider developing messages tailored to audiences based on their levels of personal experience with a particular species or conflict interaction.

Another psychological pattern commonly observed by risk researchers is that people underestimate risks to themselves but overestimate risks to others. We observed evidence of that pattern in the coyote/pet safety experiment, where respondents believed coyotes posed more threat to other people's pets than to their own pets. Verifying that common psychological traps and cognitive biases appear in these results suggests that FWC could benefit from incorporating general principals of risk communication into their communications about reducing conflicts with coyotes.

Data from this research will allow FWC staff to challenge their assumptions about target audiences. For example, we sampled residents of both urban and rural counties for the food conditioning experiments because the FWC contact team expected differences between those residents. The differences observed were not as pronounced as managers expected. Additional research on urban and rural audiences for coyote and black bear messages would be useful to more fully understand similarities and differences between these audiences.

5.2. Messaging to Encourage Problem Awareness and Definition (Lionfish)

Understanding communication about wildlife management issues is one specific task within the larger project of gathering ecological and sociological knowledge, and subsequently integrating that knowledge into decisions and actions taken by FWC to manage species such as lionfish. Since 2007, FWC staff members have been developing capacity to achieve that integration, by learning and applying ideas within a practice called adaptive impact management, or AIM (Riley et al. 2003, Decker et al. 2012). The AIM approach is built around the impacts concept, defined as follows:

> *Impacts are a subset of the various effects arising from events or interactions involving: (a) wildlife, (b) stakeholders, or (c) wildlife management interventions. Impacts are significant beneficial and detrimental effects, defined and weighted by human values. Impacts are the actionable manifestations of values. Managing levels of impacts identified by stakeholders and wildlife professionals becomes the primary focus of management within IM/AIM.* (Decker et al. 2014:6).

Impacts can be positive or negative, and for purposes of management communication can be grouped into five broad categories: ecological, economic, health and safety, psychological, and social. The lionfish message testing experiment focused on messages related to negative ecological or negative economic impacts of lionfish in Florida.

To be an impact, an effect such as loss of marine biodiversity driven by lionfish must be both recognized and evaluated as important by a stakeholder. Research scientists can provide a valuable service to fish and wildlife management by discovering or documenting human-wildlife or wildlife-wildlife-environment interactions and effects. Stakeholders, however, define which of those effects is an impact worthy of management attention (Riley et al. 2002). Wildlife agencies like FWC can play a number of crucial roles in AIM. With respect to the lionfish issue, for example, FWC managers could: (1) facilitate discovery of effects caused by lionfish (by sponsoring ecological or social science research); (2) raise public awareness of effects lionfish are having on marine life and sectors of the Florida economy; (3) engage key stakeholders to identify the effects they perceive to be impacts that warrant management attention; and (4) take actions to manage impact levels (or engage stakeholders in actions that manage impact levels).

We found evidence that the tested message frames may help FWC achieve one important task in an AIM approach to lionfish impact management. Our findings suggest that messages with ecological or economic frames have the potential to raise Floridians' awareness of the effects lionfish may exert on Florida's marine ecosystems and economy.

Communication about the ecological and economic effects of lionfish in Florida is complicated by lack of scientific research on the issue, and the fact the multiple interacting factors are simultaneously influencing Florida's marine ecosystems and economic sectors potentially affected by lionfish. FWC staff may be constrained to focus on general ecological and economic frames until specific research provides a firmer foundation for development of specific ecological and economic gain or loss messages.

The messages we tested affected multiple perceptions about lionfish traits. By contrast, we observed few effects of messaging on respondents' perceptions of coyote and black bear traits. One explanation for such findings is that respondents' beliefs about coyotes and black bears in Florida are well established and deeply held, and thus unlikely to be influenced by information they read in a test message, whereas lionfish are a relative newcomer to Florida, so respondents' beliefs about lionfish may be less firmly held and thus more susceptible to change given new information. If these results are indicative of large numbers of Floridians, they would indicate that a window of opportunity still remains for FWC to influence residents' beliefs about lionfish. Additional social science research designed to test these hypotheses could be useful to guide FWC communications about the lionfish issue.

5.3. Study Limitations and Continuing Research Needs

Collecting data through an online survey platform provider (Qualtrics) was an efficient means of reaching Floridians and it was an effective way to test message treatments with a sample of state residents. It is important to note, however, that our project was designed to inform FWC communication practices, not to provide a representative snapshot of Floridians' attitudes or beliefs about coyotes, black bears or lionfish. This project illustrates that online survey platforms, which gather data from self-selected volunteer participants, may not obtain data from the full range of target audiences with which FWC wishes to communicate. In this case, respondents were predominately white, urban, year-round residents. Survey research using more traditional sampling techniques (e.g., random-digit dialing for telephone survey samples; drawing a random sample of residents from tax rolls or available telephone directory listings) to reach clearly-defined target audiences will be necessary to provide a representative picture of views on coyotes, black bears, lionfish or other species involved in human-wildlife conflicts. If such information is of interest to FWC, the agency should consider building formal stakeholder surveys into the agency's social-science research agenda.

Resource and sampling limitations prevented us from collecting information from several key audiences. In the coyote/pet safety experiment, for example, we received adequate participation from pet owners generally, but few participants were cat owners. Due to low sample size, we could not interpret results on behavioral intention to keep cats indoors. In the lionfish experiment, few participants were scuba divers or spear fishers, so behavioral intentions related to sport diving and spear fishing could not be interpreted. In both the coyote/pet safety and lionfish experiments few respondents lived in rural counties, leaving questions about how rural residents will respond to coyote/pet safety and lionfish issue awareness messages. FWC staff should remain aware that targeted sampling strategies and research methods will be needed to obtain actionable information on audiences FWC wants to target for specialized communication or involvement in impact management activities.

6. FINDINGS AND CONCLUSIONS SUMMARY

Coyote food conditioning experiment: Respondents exposed to any of four messages (i.e., family-gain, community-gain, family-loss, community-loss) exhibited higher intentions to take seven key problem-prevention behaviors than respondents in the control group. Thus, all 4 seem to hold promise as frames for FWC messages to promote those problem-prevention behaviors. Results suggest that family-gain frames may be particularly effective to stimulate problem prevention actions among some audiences (e.g., those who have seen a coyote in the wild, residents of rural counties).

Black bear food conditioning experiment: Respondents exposed to any of six messages (i.e., family-gain, community-gain, family-loss, community-loss, bear-gain, bear-loss) exhibited higher intentions to take seven problem-prevention actions than respondents in the control group. Thus, all six seem to hold promise as frames for FWC messages to promote those problem-prevention behaviors. Results suggest that loss-frame messages will resonate with many people, but also may elevate bear-related fear and perceived risk from bears. Gain frames offer comparable persuasive power without elevating risk perceptions.

Coyote/pet safety experiment: Respondents exposed to any of four messages (i.e., individual or community-gain, individual or community-loss) exhibited higher intentions to seek out or share information about coyotes and pet safety actions than respondents in the control group. Thus, all four seem to hold promise as frames for FWC messages to promote those problem-prevention behaviors. Several findings suggested that individual exemplars may be helpful in encouraging information-seeking and information sharing behaviors, but also may elevate risk perceptions and fear.

Lionfish invasion awareness experiment: Respondents exposed to any of the four messages (i.e., general or specific economic, general or specific ecological) were more likely than the control group to agree that the lionfish issue is important, of personal interest, and necessary to address. All of the messages elevated concern about marine ecosystems and intentions to become engaged in the issue. These results suggest that all four of the tested approaches hold promise as frames for FWC messages to promote recognition of the lionfish invasion as an important public issue.

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APPENDIX A: BLACK BEAR AND COYOTE FOOD CONDITIONING MESSAGES

Black Bear Food Conditioning (6 TOTAL):

GAIN FRAME, SELF-REFERENCING (Condition #1)
Avoid Attracting Black Bears, Keep Your Family Safe

Black bears are an important part of Florida's natural heritage. They are normally timid and wary of people. The presence of a black bear in a residential area does not necessarily represent a problem. However, human-bear conflicts often occur when people leave out food sources, such as garbage, pet food, and bird feeders, which attract bears.

When human food is not accessible to black bears, they keep their natural wariness of humans. Consequently, chances for black bears to pose any safety threats to your family will be greatly reduced. Keeping all food that might attract black bears out of their reach has proven to be the most effective and feasible way to prevent conflicts.

Your family will **benefit** in several ways if you take steps to secure food and garbage:

- Your family will be safer.
- Your pets will be safer.
- Your property will be safer.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing bear problems, please contact your nearest FWC regional office. You can also visit MyFWC.com/Bear for additional information about the Florida black bear.

LOSS FRAME, SELF-REFERENCING (Condition #2)
Attracting Black Bears Puts Your Family at Risk for Problems

Black bears are an important part of Florida's natural heritage. They are normally timid and wary of people. The presence of a black bear in a residential area does not necessarily represent a problem. However, human-bear conflicts often occur when people leave out food sources, such as garbage, pet food, and bird feeders, which attract bears.

Easy access to human food may cause a bear to associate food with people and overcome their fear of humans. When black bears have lost their fear of people, they can pose a potential safety threat to your family. Keeping all food that might attract black bears out of their reach has proven to be the most effective and feasible way to prevent conflicts.

Your family will be exposed to more **risks** if you do not take steps to secure food and garbage:

- Your family will be less safe.
- Your pets will be less safe.
- Your property will be less safe.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing bear problems, please contact your nearest FWC regional office. You can also visit MyFWC.com/Bear for additional information about the Florida black bear.

GAIN FRAME, COMMUNITY-REFERENCING (Condition #3)
Avoid Attracting Black Bears, Keep Your Community Safe

Black bears are an important part of Florida's natural heritage. They are normally timid and wary of people. The presence of a black bear in a residential area does not necessarily represent a problem. However, human-bear conflicts often occur when people leave out food sources, such as garbage, pet food, and bird feeders, which attract bears.

When human food is not accessible to black bears, they keep their natural wariness of humans. Consequently, chances for black bears to pose any safety threats to people in your community will be greatly reduced. Keeping all food that might attract black bears out of their reach has proven to be the most effective and feasible way to prevent conflicts.

Your community will **benefit** in several ways if you take steps to secure food and garbage:

- Families in your community will be safer.
- Pets in your community will be safer.
- Properties in your community will be safer.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing bear problems, please contact your nearest FWC regional office. You can also visit MyFWC.com/Bear for additional information about the Florida black bear.

LOSS FRAME, COMMUNITY-REFERENCING (Condition #4)
Attracting Black Bears Puts Your Community at Risk for Problems

Black bears are an important part of Florida's natural heritage. They are normally timid and wary of people. The presence of a black bear in a residential area does not necessarily represent a problem. However, human-bear conflicts often occur when people leave out food sources, such as garbage, pet food, and bird feeders, which attract bears.

Easy access to human food may cause a bear to associate food with people and overcome their fear of humans. When black bears have lost their fear of people, they can pose a potential safety threat to people in your community. Keeping all food that might attract black bears out of their reach has proven to be the most effective and feasible way to prevent conflicts.

Your community will be exposed to more **risks** if you do not take steps to secure food and garbage:

- Families in your community will be less safe.
- Pets in your community will be less safe.
- Properties in your community will be less safe.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing bear problems, please contact your nearest FWC regional office. You can also visit MyFWC.com/Bear for additional information about the Florida black bear.

GAIN FRAME, BEAR-REFERENCING (Condition #5)
Avoid Attracting Black Bears, Keep Bears Safe

Black bears are an important part of Florida's natural heritage. They are normally timid and wary of people. The presence of a black bear in a residential area does not necessarily represent a problem. However, human-bear conflicts often occur when people leave out food sources, such as garbage, pet food, and bird feeders, which attract bears.

When human food is not accessible to black bears, they keep their natural wariness of humans. Consequently, chances for black bears to get killed will be greatly reduced. Keeping all food that might attract black bears out of their reach has proven to be the most effective and feasible way to prevent conflicts.

Black bears will **benefit** in several ways if you take steps to secure food and garbage:

- Bears will be more likely to stay wild.
- Bears will be less likely to get euthanized.
- Bears will be less likely to come into areas where they may be hit by vehicles.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing bear problems, please contact your nearest FWC regional office. You can also visit MyFWC.com/Bear for additional information about the Florida black bear.

LOSS FRAME, BEAR-REFERENCING (6)

Attracting Black Bears Puts Bears' Well-being at Risk

Black bears are an important part of Florida's natural heritage. They are normally timid and wary of people. The presence of a black bear in a residential area does not necessarily represent a problem. However, human-bear conflicts often occur when people leave out food sources, such as garbage, pet food, and bird feeders, which attract bears.

Easy access to human food may cause a bear to associate food with people and overcome their fear of humans. When black bears have lost their fear of people, it can pose a potential threat to bears' well-being. Keeping all food that might attract black bears out of their reach has proven to be the most effective and feasible way to prevent conflicts.

Black bears will be exposed to more **risks** if you do not take steps to secure food and garbage:

- Food-conditioned bears will lose their wildness and come into conflict with people.
- Food-conditioned bears will be more likely to get euthanized.
- Bears will be more likely to come into areas where they may be hit by vehicles.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing bear problems, please contact your nearest FWC regional office. You can also visit MyFWC.com/Bear for additional information about the Florida black bear.

Coyote Food Conditioning (4 TOTAL):

GAIN FRAME, SELF-REFERENCING (Condition #1)
Avoid Attracting Coyotes, Keep Your Family Safe

Coyotes are found throughout Florida. They are normally timid and wary of people. However, problems occur when people begin to feed coyotes, intentionally or unintentionally. Coyotes are omnivores (they eat plant and animal matter) and will adapt to eat whatever foods are available, including garbage, pet food, and domestic animals.

When human food is not accessible to coyotes, they keep their natural wariness of humans. Consequently, chances for coyotes to pose any safety threat to your pets and family will be greatly reduced. Keeping all food that might attract coyotes out of their reach has proven to be the most effective and feasible way to prevent conflicts with coyotes.

Your family will **benefit** in several ways if you take steps to secure food and garbage:

- Your family will be safer.
- Your pets will be safer.
- Your property will be safer.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing coyote problems, please contact your nearest FWC regional office. You can also visit MyFWC.com for additional information about coyotes.

LOSS FRAME, SELF-REFERENCING (Condition #2)
Attracting Coyotes Puts Your Family at Risk for Problems

Coyotes are found throughout Florida. They are normally timid and wary of people. However, problems occur when people begin to feed coyotes, intentionally or unintentionally. Coyotes are omnivores (they eat plant and animal matter) and will adapt to eat whatever foods are available, including garbage, pet food, and domestic animals.

Easy access to human food can lead to coyotes losing their fear of humans. When coyotes have lost their fear of people, they may pose a potential safety threat to your pets and family. Keeping all food that might attract coyotes out of their reach has proven to be the most effective and feasible way to prevent conflicts with coyotes.

Your family will be exposed to more **risks** if you do not take steps to secure food and garbage:

- Your family will be less safe.
- Your pets will be less safe.
- Your property will be less safe.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing coyote problems, please contact your nearest FWC regional office. You can also visit MyFWC.com for additional information about coyotes.

GAIN FRAME, COMMUNITY-REFERENCING (Condition #3)
Avoid Attracting Coyotes, Keep Your Community Safe

Coyotes are found throughout Florida. They are normally timid and wary of people. However, problems occur when people begin to feed coyotes, intentionally or unintentionally. Coyotes are omnivores (they eat plant and animal matter) and will adapt to eat whatever foods are available, including garbage, pet food, and domestic animals.

When human food is not accessible to coyotes, they keep their natural wariness of humans. Consequently, chances for coyotes to pose any safety threat to pets and families in your community will be greatly reduced. Keeping all food that might attract coyotes out of their reach has proven to be the most effective and feasible way to prevent conflicts with coyotes.

Your community will **benefit** in several ways if you take steps to secure food and garbage:

- Families in your community will be safer.
- Pets in your community will be safer.
- Properties in your community will be safer.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing coyote problems, please contact your nearest FWC regional office. You can also visit MyFWC.com for additional information about coyotes.

LOSS FRAME, COMMUNITY-REFERENCING (Condition #4)
Attracting Coyotes Puts Your Community at Risk for Problems

Coyotes are found throughout Florida. They are normally timid and wary of people. However, problems occur when people begin to feed coyotes, intentionally or unintentionally. Coyotes are omnivores (they eat plant and animal matter) and will adapt to eat whatever foods are available, including garbage, pet food, and domestic animals.

Easy access to human food can lead to coyotes losing their fear of humans. When coyotes have lost their fear of people, they may pose a potential safety threat to pets and people in your community. Keeping all food that might attract coyotes out of their reach has proven to be the most effective and feasible way to prevent conflicts with coyotes.

Your community will be exposed to more **risks** if you do not take steps to secure food and garbage:

- Families in your community will be less safe.
- Pets in your community will be less safe.
- Properties in your community will be less safe.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing coyote problems, please contact your nearest FWC regional office. You can also visit MyFWC.com for additional information about coyotes.

APPENDIX B: COYOTE/PET SAFETY MESSAGES

Coyote/Pet Safety (4 TOTAL):

GAIN FRAME, INDIVIDUAL EXEMPLAR (Condition #1)
Keeping Cats Indoors will Protect Them from Coyotes

Coyotes are found throughout Florida. This medium-sized member of the dog family is extremely adaptable, thriving in urban, suburban and rural areas.

Coyotes are omnivores (they eat plant and animal matter) and will adapt to eat whatever foods are available, including garbage, pet food, and domestic animals. The best way to prevent conflicts with coyotes is to remove food attractants around the home and keep garbage secured in cans with tight lids. In addition to removing food attractants, cat owners should always keep their cats indoors to prevent encounters between their pets and coyotes.

Some residents have closely felt what it means to have coyotes around. When a longtime resident of Citrus County noticed a couple of coyotes wandering around her neighborhood last year, she realized her behaviors had to change. This cat owner used to let her 5-year-old cat, Lola, roam freely in her yard. The fear of losing her cat to the coyotes compelled Lola's owner to always keep her pet indoors. "This change was difficult at first for both Lola and me," she said, "We just weren't used to it. But it is working. I know there are coyotes in my neighborhood now, so I have to do a little more to make sure Lola is safe."

You can do the same for your own pets. The chances of coyote attacks can be eliminated if you make sure your cats are kept indoors. By exercising this simple practice, you can rest assured that your cats will never be harmed by coyotes.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing coyote problems, please contact your nearest FWC regional office. You can also visit MyFWC.com for additional information about coyotes.

LOSS FRAME, INDIVIDUAL EXEMPLAR (Condition #2)
Allowing Cats to Go Outdoors Puts Them in Danger

Coyotes are found throughout Florida. This medium-sized member of the dog family is extremely adaptable, thriving in urban, suburban and rural areas.

Coyotes are omnivores (they eat plant and animal matter) and will adapt to eat whatever foods are available, including garbage, pet food, and domestic animals. The best way to prevent conflicts with coyotes is to remove food attractants around the home and keep garbage secured in cans with tight lids. In addition to removing food attractants, cat owners should always keep their cats indoors to prevent encounters between their pets and coyotes.

Some residents have closely felt what it means to have coyotes around. Two months ago, a longtime resident of Citrus County let her 5-year-old cat, Lola, out into the front yard, then went back inside for a minute. That was all the time it took for Lola's day to turn tragic. Lola's owner heard her cat scream, and ran back outside to find Lola had been bitten by a coyote and was bleeding. "She died in my arms," Lola's owner said, "It was devastating. Lola was like family to me. I knew there had been coyotes around. I never should have left her out there by herself."

Don't let this happen to your pets. Failing to keep cats indoors leaves them vulnerable to encounters with coyotes, something you may regret in the future.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing coyote problems, please contact your nearest FWC regional office. You can also visit MyFWC.com for additional information about coyotes.

GAIN FRAME, COLLECTIVE EXEMPLAR (Condition #3)
Keeping Cats Indoors will Protect Them from Coyotes

Coyotes are found throughout Florida. This medium-sized member of the dog family is extremely adaptable, thriving in urban, suburban and rural areas.

Coyotes are omnivores (they eat plant and animal matter) and will adapt to eat whatever foods are available, including garbage, pet food, and domestic animals. The best way to prevent conflicts with coyotes is to remove food attractants around the home and keep garbage secured in cans with tight lids. In addition to removing food attractants, cat owners should always keep their cats indoors to prevent encounters between their pets and coyotes.

As coyote populations have become established in neighbors across Florida, many cat owners have become more cautious and have changed their behaviors. The fear of losing their pets to coyotes compelled them to keep their cats indoors at all times. People who exercise such caution are providing their pets with complete protection from encounters with coyotes.

You can do the same for your own pets. The chances of coyote attacks can be eliminated if you make sure your cats are kept indoors. By exercising this simple practice, you can rest assured that your cats will never be harmed by coyotes.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing coyote problems, please contact your nearest FWC regional office. You can also visit MyFWC.com for additional information about coyotes.

LOSS FRAME, COLLECTIVE EXEMPLAR (Condition #4)
Allowing Cats to Go Outdoors Puts Them in Danger

Coyotes are found throughout Florida. This medium-sized member of the dog family is extremely adaptable, thriving in urban, suburban and rural areas.

Coyotes are omnivores (they eat plant and animal matter) and will adapt to eat whatever foods are available, including garbage, pet food, and domestic animals. The best way to prevent conflicts with coyotes is to remove food attractants around the home and keep garbage secured in cans with tight lids. In addition to removing food attractants, cat owners should always keep their cats indoors to prevent encounters between their pets and coyotes.

Many people who have lost their pets to coyotes were unaware of, or did not take seriously, the risks coyotes pose to their cats. They often allowed their cats to roam freely outdoors. Unfortunately, in areas with coyotes, these actions could cost them the lives of their pets.

Don't let this happen to your pets. Failing to keep cats indoors leaves your pets vulnerable to encounters with coyotes, something you may regret in the future.

The Florida Fish and Wildlife Conservation Commission (FWC) is committed to helping people learn what they can do to avoid problems with wildlife. If you are experiencing coyote problems, please contact your nearest FWC regional office. You can also visit MyFWC.com for additional information about coyotes.

APPENDIX C: LIONFISH ECOLOGICAL AND ECONOMIC IMPACT MESSAGES

Lionfish (4 TOTAL):

GENERAL ECOLOGICAL IMPACTS (Condition #1)
Lionfish Invasion Threatens Florida Ecosystems

Lionfish are a nonnative, invasive species in Florida. They were first found in the coastal waters of southern Florida about 30 years ago. No one knows how they were introduced (it may have started with accidental or intentional release of aquarium fish). Authorities do know that lionfish populations have grown and spread rapidly. Lionfish can thrive in a wide range of marine habitats and now occur in coastal areas throughout the southeast United States and Caribbean. This lionfish invasion has the potential to significantly alter the population dynamics of Florida's native marine species.

Because they are generalist predators that eat a wide range of native fish and invertebrates, lionfish can disrupt native marine ecosystems in many ways. For example, algae can overrun coral reef systems when lionfish predation eliminates fish species that normally keep algae in check. As lionfish prey on and/or compete for resources with native fish, biodiversity in an ecosystem declines, until all that remains are lionfish and a few other fish species.

In Florida, there are no natural mechanisms to control lionfish populations. Harvest by recreational and commercial divers (using spears or hand-held nets) is currently the best means of controlling lionfish and minimizing their unwanted impacts.

The Florida Fish and Wildlife Conservation Commission (FWC) encourages people to remove lionfish whenever possible and consider participating in lionfish removal derbies and tournaments. You can also help by educating yourself and people around you. To learn more about lionfish, visit MyFWC.com/Lionfish.

SPECIFIC ECOLOGICAL IMPACTS (Condition #2)
Lionfish Invasion Threatens to Wipe out Populations of Reef Fish

Lionfish are a nonnative, invasive species in Florida. They were first found in the coastal waters of southern Florida about 30 years ago. No one knows how they were introduced (it may have started with accidental or intentional release of aquarium fish). Authorities do know that lionfish populations have grown and spread rapidly. Lionfish can thrive in a wide range of marine habitats and now occur in coastal areas throughout the southeast United States and Caribbean. This lionfish invasion has the potential to significantly alter the population dynamics of Florida's native marine species, and even eliminate some local species.

Because they are generalist predators that eat a wide range of local fish and invertebrates, lionfish can disrupt local marine ecosystems in many ways. For example, fairy basslets, a small, vibrantly colored fish species that live on coral reefs, may face a high risk of local extinction because of lionfish preying on them. Recent research demonstrates that lionfish are more voracious predators than other native fish, and will still hunt until almost the last of their prey is gone. This poses a significant threat to fairy basslets as they live in small local populations and are vulnerable to local extinction.

In Florida, there are no natural mechanisms to control lionfish populations. Harvest by recreational and commercial divers (using spears or hand-held nets) is currently the best means of controlling lionfish and minimizing their unwanted impacts.

The Florida Fish and Wildlife Conservation Commission (FWC) encourages people to remove lionfish whenever possible and consider participating in lionfish removal derbies and tournaments. You can also help by educating yourself and people around you. To learn more about lionfish, visit MyFWC.com/Lionfish.

GENERAL ECONOMIC IMPACTS (Condition #3)
Lionfish Invasion Threatens Florida Economy

Lionfish are a nonnative, invasive species in Florida. They were first found in the coastal waters of southern Florida about 30 years ago. No one knows how they were introduced (it may have started with accidental or intentional release of aquarium fish). Authorities do know that lionfish populations have grown and spread rapidly. Lionfish can thrive in a wide range of marine habitats and now occur in coastal areas throughout the southeast United States and Caribbean. This lionfish invasion has the potential to significantly alter the population dynamics of Florida's native marine species and economy.

The lionfish invasion has the potential to negatively impact recreational and commercial fishing, and thus may impact the overall economy of Florida. For example, if the lionfish invasion significantly reduced species such as grouper and snapper, fishing-related tourism may decline. That would in turn impact hotels, restaurants, retail stores and other businesses that depend on revenues generated by sport fishing.

In Florida, there are no natural mechanisms to control lionfish populations. Harvest by recreational and commercial divers (using spears or hand-held nets) is currently the best means of controlling lionfish and minimizing their unwanted impacts.

The Florida Fish and Wildlife Conservation Commission (FWC) encourages people to remove lionfish whenever possible and consider participating in lionfish removal derbies and tournaments. You can also help by educating yourself and people around you. To learn more about lionfish, visit MyFWC.com/Lionfish.

SPECIFIC ECONOMIC IMPACTS (Condition #4)
Lionfish Invasion Threatens the Livelihood of Commercial Lobstermen

Lionfish are a nonnative, invasive species in Florida. They were first found in the coastal waters of southern Florida about 30 years ago. No one knows how they were introduced (it may have started with accidental or intentional release of aquarium fish). Authorities do know that lionfish populations have grown and spread rapidly. Lionfish can thrive in a wide range of marine habitats and now occur in coastal areas throughout the southeast United States and Caribbean. This lionfish invasion has the potential to significantly reduce populations of commercially-important marine species.

Because of the lionfish invasion, the livelihoods of some commercial fishermen may be at risk. For example, In the Florida Keys, lobster fishermen report that lionfish are now the leading bycatch species in their industry, and lobster harvest is down by as much as 50 percent. Spiny lobsters have been found in the lionfish diet and some research suggests that local declines in spiny lobster populations are associated with local increases in the lionfish population. If they continue to see declining harvests, lobstermen in the Florida Keys may lose their businesses. In Florida, there are no natural mechanisms to control lionfish populations. Harvest by recreational and commercial divers (using spears or hand-held nets) is currently the best means of controlling lionfish and minimizing their unwanted impacts.

The Florida Fish and Wildlife Conservation Commission (FWC) encourages people to remove lionfish whenever possible and consider participating in lionfish removal derbies and tournaments. You can also help by educating yourself and people around you. To learn more about lionfish, visit MyFWC.com/Lionfish.

APPENDIX D: ANCILLARY RESULTS TABLES, COYOTE FOOD CONDITIONING EXPERIMENT

Table D1. Comparison of respondents' demographic characteristics, by experimental conditions (Family/Gain(FG), Community/Gain(CG), Family Loss(FL), Community Loss(CL), and Control), coyote food conditioning experiment.

		Coyote food conditioning experimental conditions					
		Family Gain	Community Gain	Family Loss	Community Loss	Control	Overall
Gender N (%)	Male	27 (30)	30 (33.3)	42 (44.2)	35 (37.2)	32 (35.2)	166 (36)
	Female	63 (70)	61 (67)	53 (55.8)	59 (62.8)	59 (64.8)	295 (64)
Age Mean (SD)		52.9 (16.7)	49 (16.7)	52.9 (15.2)	52.3 (16.6)	52.9 (17.3)	52 (16.5)
Education N (%)	Grade 8 or lower	0	1 (1.1)	1 (1.1)	1 (1.1)	0	3 (0.7)
	Some high school	5 (5.6)	1 (1.1)	3 (3.2)	1 (1.1)	2 (2.2)	12 (2.6)
	High school	21 (23.3)	18 (19.8)	22 (23.2)	17 (18.1)	15 (16.5)	93 (20.2)
	Some college	22 (24.4)	22 (24.2)	25 (26.3)	22 (23.4)	28 (30.8)	119 (25.8)
	Associate degree	15 (16.7)	16 (17.6)	13 (13.7)	19 (20.2)	11 (12.1)	74 (16.1)
	Bachelor's degree	16 (17.8)	25 (27.5)	20 (21.1)	20 (21.3)	21 (23.1)	102 (22.1)
	Master's degree	8 (8.9)	5 (5.5)	8 (8.4)	10 (10.6)	11 (12.1)	42 (9.1)
	Professional degree	2 (2.2)	1 (1.1)	1 (1.1)	1 (1.1)	1 (1.1)	6 (1.3)
	Doctorate degree	1 (1.1)	2 (2.2)	2 (2.1)	3 (3.2)	2 (2.2)	10 (2.2)
Household income in thousands (median)		35K-50K	35K-50K	35K-50K	35K-50K	50K-75K	35K-50K
Years of residence in Florida Mean (SD)		22.9 (16.2)	22.5 (16.8)	24.5 (17.5)	21.9 (14.2)	26.4 (17.2)	23.6 (16.4)
County N (%)	Rural	45 (50)	49 (53.8)	52 (54.7)	49 (52.1)	58 (63.7)	253 (54.9)
	Non-Rural	45 (50)	42 (46.2)	43 (45.3)	45 (47.9)	33 (36.3)	208 (45.1)

Table D1. (continued).

		Family Gain	Community Gain	Family Loss	Community Loss	Control	Overall
Race N (%)	White	77 (85.6)	73 (80.2)	80 (84.2)	81 (86.2)	77 (84.6)	388 (84.2)
	Black or African American	7 (7.8)	6 (6.6)	7 (7.4)	3 (3.2)	5 (5.5)	28 (6.1)
	Asian	0	0	1 (1.1)	0	4 (4.4)	5 (1.1)
	American Indian or Alaska Native	0	2 (2.2)	0	1 (1.1)	0	3 (0.7)
	Native Hawaiian or other Pacific Islander	1 (1.1)	1 (1.1)	2 (2.1)	0	1 (1.1)	5 (1.1)
	Hispanic or Latino	5 (5.6)	8 (8)	5 (5.3)	7 (7.4)	4 (4.4)	29 (6.3)
	Other, including multi-ethnic and/or multi-racial	0	0	0	1(1.1)	0	1(0.2)
Residency status N (%)	Year-round	87 (96.7)	90 (98.9)	94 (98.9)	90 (95.7)	90 (98.9)	451 (97.8)
	Seasonal	3 (3.3)	1 (1.1)	1 (1.1)	4 (4.3)	1 (1.1)	10 (2.2)
Children in home N (%)	Yes	12 (13.3)	24 (26.4)	21 (22.1)	21 (22.3)	17 (18.7)	95 (20.6)
Pet in home N (%)	Yes	65 (72.2)	68 (74.7)	68 (71.6)	60 (63.8)	72 (79.1)	333 (72.2)
Hunting N (%)	Yes	15 (15.5)	22 (24.2)	15 (15.8)	14 (14.9)	19 (20.9)	84 (18.2)
Fishing N (%)	Yes	49 (54.4)	59 (64.9)	48 (50.5)	50 (53.2)	54 (59.4)	260 (56.4)
Observing or studying wildlife N (%)	Yes	60 (66.6)	72 (79.1)	66 (69.5)	59 (62.8)	67 (73.7)	324 (70.3)
Filling bird feeders N (%)	Yes	44 (48.9)	44 (48.4)	48 (50.5)	52 (55.4)	56 (61.6)	217 (47.1)
Saw coyotes in the wild N (%)	Yes	36 (40)	50 (54.9)	39 (41.1)	43 (45.7)	39 (42.9)	207 (44.9)
Enjoying hearing or seeing coyotes in the wild N (%)	Yes	27 (30)	38 (41.8)	32 (33.7)	29 (30.9)	23 (25.3)	149 (32.3)
Negative interaction with coyotes N (%)	Yes	3 (3.3)	4 (4.4)	2 (2.1)	6 (6.4)	4 (4.4)	19 (4.1)

Table D2. Means and standard deviations of behavioral intentions related to coyote food conditioning, by experimental conditions (Family/Gain(FG), Community/Gain(CG), Family Loss(FL), Community Loss(CL), and Control), coyote food conditioning experiment.

	Family Gain	Community Gain	Family Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Feeding coyotes	85 1.49 1.44	84 1.57 1.61	88 1.75 1.56	92 1.35 1.04	79 1.57 1.24
Keep bird and wildlife feeders out of coyotes' reach	71 **5.85**[a] 1.72	75 **5.24**[b] 2.13	78 **5.63**[c] 1.78	81 **5.00**[d] 2.29	70 **3.93**[abcd] 2.34
Secure garbage and compost in animal-proof containers	82 **6.26**[aef] 1.43	87 **5.52**[be] 2.12	86 **5.44**[cf] 1.85	89 **5.56**[d] 2.03	83 **4.80**[abcd] 2.33
Pick up leftovers if feeding pets outdoors	45 **6.07**[a] 1.51	48 4.92 2.31	55 **5.73**[b] 1.85	46 **5.41**[c] 2.17	61 **4.48**[abc] 2.51
Remove all pet food from your yard	46 **6.24**[a] 1.34	54 4.78 2.47	52 **5.83**[b] 1.87	52 **5.35**[c] 2.24	63 **4.46**[abc] 2.44
Report neighbors that are feeding coyotes	79 **5.37**[ae] 1.92	84 **4.74**[b] 2.26	82 **4.59**[ce] 2.06	87 **4.99**[d] 2.20	76 **3.45**[abcd] 2.29
Ask neighbors to remove food that might attract coyotes	82 **4.91**[a] 2.07	87 **4.30**[b] 2.33	85 **4.52**[c] 2.03	88 **4.50**[d] 2.27	79 **3.39**[abcd] 2.28
Ask neighbors to secure trash so that it is not available to coyotes	81 **4.95**[a] 2.02	87 **4.39**[b] 2.21	87 **4.55**[c] 2.11	91 **4.44**[d] 2.38	80 **3.19**[abcd] 2.13

Table D2. (continued).

	Family Gain	Community Gain	Family Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Seek out more information about coyotes	88 4.41 2.04	85 3.79 2.11	90 4.21 2.14	89 3.87 2.15	81 3.54 2.17
Avoid more information about coyotes	86 2.40 1.77	89 2.25 1.67	91 2.44 1.71	91 2.00 1.49	79 2.44 1.72
Share information about coyotes with other people	86 **5.22[a]** 1.65	90 **4.68[b]** 2.05	90 **5.03[c]** 1.98	90 **4.88[d]** 2.12	80 **3.46[abcd]** 2.05
Avoid going to places where coyotes frequent	84 **5.23[a]** 2.01	87 **4.40[b]** 2.19	88 **4.91[c]** 1.98	90 **4.54[d]** 2.37	78 **3.42[abcd]** 3.36
Kill coyotes	83 1.77 1.62	86 1.84 1.65	86 2.07 1.80	90 1.60 1.42	79 2.14 1.89
Hire a trapper to catch coyotes	78 2.71 2.13	83 2.00 1.69	87 2.30 1.86	86 2.20 1.84	78 2.29 1.86
Remove coyotes	77 2.74 2.14	81 2.20 1.95	79 2.49 1.94	86 2.26 1.81	76 2.49 1.88

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table D3. Behavioral intentions by experimental conditions (only includes behavioral intention items where all four message groups differed from the control condition), coyote food conditioning experiment.

		Coyote food Conditioning message conditions				
		FG	CG	FL	CL	Control
		N=87	N=89	N=93	N=95	N=96
		%	%	%	%	%
Keep bird and wildlife feeders out of coyotes' reach	Very Unlikely	4.6	9.0	5.4	13.7	20.8
	Moderately Unlikely	0.0	1.1	2.2	4.2	5.2
	Somewhat Unlikely	2.3	1.1	0.0	3.2	3.1
	Neither	12.6	10.1	14.0	10.5	11.5
	Somewhat Likely	5.7	11.2	8.6	8.4	11.5
	Moderately Likely	8.0	11.2	12.9	6.3	3.1
	Very Likely	42.5	37.1	36.6	38.9	18.8
	N/A	24.1	19.1	20.4	14.7	26.0
Secure garbage and compost in animal-proof containers	Very Unlikely	2.3	11.2	7.5	10.5	16.7
	Moderately Unlikely	2.3	1.1	1.1	1.1	5.2
	Somewhat Unlikely	1.1	2.2	3.2	2.1	3.1
	Neither	4.6	3.4	9.7	11.6	8.3
	Somewhat Likely	9.2	12.4	20.4	5.3	10.4
	Moderately Likely	10.3	11.2	9.7	12.6	8.3
	Very Likely	59.8	52.8	37.6	50.5	35.4
	N/A	10.3	5.6	10.8	6.3	12.5
Report neighbors that are feeding coyotes	Very Unlikely	9.2	15.7	14.0	14.7	30.2
	Moderately Unlikely	2.3	1.1	2.2	3.2	4.2
	Somewhat Unlikely	3.4	4.5	2.2	2.1	3.1
	Neither	12.6	12.4	24.7	14.7	12.5
	Somewhat Likely	13.8	11.2	10.8	8.4	13.5
	Moderately Likely	12.6	15.7	9.7	13.7	2.1
	Very Likely	33.3	30.3	20.4	34.7	13.5
	N/A	12.6	9.0	16.1	8.4	20.8
Ask neighbors to remove food that might attract coyotes	Very Unlikely	14.9	19.1	14.0	21.1	32.3
	Moderately Unlikely	2.3	6.7	3.2	3.2	4.2
	Somewhat Unlikely	4.6	4.5	2.2	1.1	4.2
	Neither	14.9	14.6	24.7	12.6	11.5
	Somewhat Likely	14.9	12.4	15.1	17.9	12.5
	Moderately Likely	14.9	9.0	11.8	11.6	4.2
	Very Likely	24.1	28.1	17.2	25.3	12.5
	N/A	9.2	5.6	11.8	7.4	18.8

Table D3. (Continued).

		Coyote food Conditioning message conditions				
		FG	CG	FL	CL	Control
		N=87	N=89	N=93	N=95	N=96
		%	%	%	%	%
Ask neighbors to secure trash so that it is not available to coyotes	Very Unlikely	12.6	16.9	16.1	23.2	32.3
	Moderately Unlikely	3.4	3.4	2.2	4.2	6.3
	Somewhat Unlikely	2.3	6.7	3.2	4.2	4.2
	Neither	18.4	18.0	23.7	10.5	16.7
	Somewhat Likely	16.1	10.1	15.1	13.7	8.3
	Moderately Likely	11.5	15.7	7.5	10.5	6.3
	Very Likely	25.3	23.6	22.6	29.5	8.3
	N/A	10.3	5.6	9.7	4.2	17.7
Share information about coyotes with other people	Very Unlikely	6.9	12.4	8.6	14.7	26.0
	Moderately Unlikely	4.6	4.5	4.3	1.1	5.2
	Somewhat Unlikely	1.1	4.5	3.2	5.3	7.3
	Neither	20.7	15.7	19.4	14.7	14.6
	Somewhat Likely	17.2	21.3	15.1	15.8	13.5
	Moderately Likely	23.0	12.4	11.8	11.6	9.4
	Very Likely	21.8	27.0	31.2	31.6	6.3
	N/A	4.6	2.2	6.5	5.3	17.7
		%	%	%	%	%
Avoid going to places where coyotes frequent	Very Unlikely	10.3	14.6	10.8	20.0	29.2
	Moderately Unlikely	3.4	4.5	3.2	6.3	8.3
	Somewhat Unlikely	3.4	10.1	4.3	3.2	3.1
	Neither	19.5	16.9	22.6	14.7	11.5
	Somewhat Likely	6.9	7.9	12.9	6.3	7.3
	Moderately Likely	11.5	16.9	8.6	11.6	6.3
	Very Likely	36.8	23.6	29.0	32.6	14.6
	N/A	8.0	5.6	8.6	5.3	19.8

Table D4. Means and standard deviations of emotional responses, by experimental conditions (Family/Gain (FG), Community/Gain (CG), Family Loss (FL), Community Loss (CL), and Control), coyote food conditioning experiment.

	Family Gain	Community Gain	Family Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Afraid	90 **2.54**[ad] 1.90	91 **2.03**[def] 1.52	95 **2.85**[be] 1.97	94 **2.68**[cf] 1.74	91 **1.91**[abc] 1.55
Angry	90 2.11 1.81	91 1.98 1.42	95 2.31 1.73	94 2.29 1.42	91 1.80 1.39
Sad	87 **2.71**[a] 1.87	91 **2.40**[d] 1.73	94 **2.92**[bd] 1.84	94 **2.87**[c] 1.79	90 **2.12**[abc] 1.61
Guilty	84 1.96 1.48	90 1.62 1.16	94 1.79 1.38	94 1.87 1.38	90 1.57 1.26
Optimistic	89 **4.12**[a] 1.82	90 **4.08**[b] 1.93	94 **3.70**[c] 1.85	94 **3.66**[d] 1.78	91 **4.96**[abcd] 1.74

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table D5. Perceived seriousness of threats coyotes pose to self and others, by experimental conditions, coyote food conditioning experiment.

	Family Gain	Community Gain	Family Loss	Community Gain	Control
Perceived threat …	N Mean[1] *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
to oneself	87 2.76 1.92	91 2.42 1.78	94 2.45 1.81	94 2.71 1.86	91 2.35 1.86
to one's family	87 2.71 1.97	91 2.35 1.75	94 2.46 1.89	94 2.75 1.99	91 2.44 1.89
to one's pets	63 3.22 2.11	68 2.69 1.86	68 2.94 1.93	60 3.20 2.22	72 2.81 2.06
to other people in one's community	87 3.05 1.98	91 2.48 1.60	94 2.82 1.85	94 3.03 1.85	91 2.64 2.01
to other people's pets in one's community	90 3.55 2.01	91 3.16 1.97	95 3.16 1.95	94 3.49 2.05	91 2.79 2.06

[1] Mean of 7-point scale where 1=not at all serious and 7=extremely serious.

Table D6. Perceived likelihood that a coyote will harm people or pets, by experimental conditions, coyote food conditioning experiment.

Perceived likelihood that a coyote …	Family Gain	Community Gain	Family Loss	Community Loss	Control
	N Mean[1] *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
will harm oneself	90 2.16 1.70	91 2.08 1.44	95 2.00 1.56	94 2.13 1.55	91 1.92 1.39
will harm one's family	90 2.23 1.76	91 2.14 1.40	95 1.91 1.45	94 2.19 1.54	91 2.08 1.51
will harm one's pets	65 2.52 1.80	68 2.32 1.70	68 2.37 1.71	60 2.63 1.80	72 2.50 1.80
will harm other people in one's community	90 2.61 1.78	91 2.34 1.54	95 2.69 1.78	94 2.59 1.68	91 2.25 1.58
Will harm other people's pets in one's community	90 3.17 1.84	91 2.99 1.88	95 3.11 1.89	94 3.23 1.84	91 2.67 1.86

[1] Mean of 7-point scale where 1=very unlikely and 7=very likely.

Table D7. Means and standard deviations of attitudes toward recommended behaviors, by experimental conditions (Family/Gain (FG), Community/Gain (CG), Family Loss (FL), Community Loss (CL), and Control), coyote food conditioning experiment.

	Family Gain	Community Gain	Family Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Ineffective - Effective	90 6.66 0.93	91 6.33 1.26	95 6.38 1.27	94 6.24 1.40	91 6.11 1.33
Unwise - Wise	90 6.66 0.94	91 6.47 1.28	95 6.37 1.35	94 6.22 1.52	91 6.37 1.14
Worthless - Valuable	90 6.59 1.14	91 6.39 1.15	95 6.40 1.29	94 6.17 1.50	91 6.23 1.20
Useless - Useful	90 6.52 1.27	91 6.34 1.21	95 6.28 1.40	94 6.19 1.48	91 6.26 1.21

Table D8. Means and standard deviations of beliefs about coyotes, by experimental conditions (Family/Gain (FG), Community/Gain (CG), Family Loss (FL), Community Loss (CL), and Control), coyote food conditioning experiment.

	Family Gain	Community Gain	Family Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Timid	90 **4.38**[a] 1.70	91 **4.26**[b] 1.68	95 **4.01**[c] 1.74	94 3.78 1.84	91 **3.36**[abc] 1.46
Aggressive	90 4.37 1.73	91 4.26 1.74	95 4.41 1.73	94 4.66 1.54	91 4.77 1.61
Beautiful	90 4.81 1.91	91 4.75 1.79	95 4.59 1.50	94 4.60 1.88	91 4.48 1.79
Common	90 4.28 1.72	91 4.21 1.54	95 4.00 1.62	94 3.87 1.65	91 3.95 1.62
Nuisance	90 4.29 1.84	91 4.43 1.59	95 4.52 1.77	94 4.38 1.81	91 4.55 1.66
Bold	90 4.40 1.61	91 4.51 1.57	95 4.64 1.64	94 4.78 1.60	91 4.92 1.50
Intimidating	90 4.71 1.76	91 4.30 1.79	95 4.67 1.77	94 4.94 1.55	91 4.69 1.74

*Note: Rows with the same letter (a-a, b-b, c-c) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

APPENDIX E: ANCILLARY RESULTS TABLES, BLACK BEAR FOOD CONDITIONING EXPERIMENT

Table E1. Comparison of respondents' demographic characteristics, by experimental conditions (Family/Gain (FG), Community/Gain (CG), Bear/Gain (BG), Family/Loss (FL), Community/Loss (CL), Bear/Loss (BL) and Control), black bear food conditioning experiment.

		Black bear food conditioning experimental conditions							
		FG	CG	BG	FL	CL	BL	Control	Overall
Gender N (%)	Male	43 (37.4)	49 (41.2)	54 (44.6)	51 (41.8)	32 (31.4)	43 (38.7)	48 (39.7)	320 (39.5)
	Female	72 (62.6)	70 (58.8)	67 (55.4)	71 (58.2)	70 (68.6)	68 (61.3)	73 (60.3)	491 (60.5)
Age Mean (SD)		46.1 (17.1)	44.9 (15.3)	48.5 (17.9)	48.6 (17.5)	45.8 (16.9)	49.3 (17)	50.2 (17.2)	47.7 (17)
Education N (%)	Grade 8 or lower	0	0	0	0	1 (1)	0	0	1 (0.1)
	Some high school	4 (3.5)	3 (2.5)	4 (3.3)	6 (4.9)	4 (3.9)	3 (2.7)	1 (0.8)	25 (3.1)
	High school	20 (17.4)	21 (17.6)	26 (21.5)	22 (18)	20 (19.6)	18 (16.2)	23(19)	150 (18.5)
	Some college	21 (18.3)	34 (28.6)	34 (28.1)	37 (30.3)	28 (27.5)	28 (25.2)	31 (25.6)	213 (26.3)
	Associate degree	21 (18.3)	16 (13.4)	13 (10.7)	24 (19.7)	13 (12.7)	18 (16.2)	15 (12.4)	120 (14.8)
	Bachelor's degree	30 (26.1)	31 (26.1)	29 (24)	23 (18.9)	26 (25.5)	28 (25.2)	30 (24.8)	197 (24.3)
	Master's degree	17 (14.8)	12 (10.1)	11 (9.1)	8 (6.6)	9 (8.8)	9 (8.1)	16 (13.2)	82 (10.1)
	Professional degree	2 (1.7)	1 (0.8)	4 (3.3)	1 (0.8)	0	3 (2.7)	1 (0.8)	12 (1.5)
	Doctorate degree	0	1 (0.8)	0	1 (0.8)	1 (1)	4 (3.6)	4 (3.3)	11 (1.4)
Household income in thousands (median)		50K-75K	35K-50K	50K-75K	50K-75K	50K-75K	35K-50K	35K-50K	35K-50K
Years of Florida residence Mean (SD)		25.3 (16.8)	23.8 (16.5)	20.8(14.8)	24.9 (17.4)	24.1 (15.6)	23.9 (17.8)	22.6 (15.1)	23.6 (16.3)
County N (%)	Rural	47 (40.9)	53 (44.5)	60 (49.6)	54 (44.3)	45 (44.1)	45 (40.5)	51 (42.1)	355 (43.8)
	Non-Rural	68 (59.1)	66 (55.5)	61 (50.4)	68 (55.7)	57 (55.9)	66 (59.5)	70 (57.9)	456 (56.2)

Table E1. (continued).

		Black bear food conditioning experimental conditions							
		FG	CG	BG	FL	CL	BL	Control	Overall
Race N (%)	White	99 (86.1)	91 (76.5)	100 (82.6)	92 (75.4)	75 (73.5)	82 (73.9)	94 (77.7)	633 (78.1)
	Black or African American	6 (5.2)	14 (11.8)	8 (6.6)	7 (5.7)	12 (11.8)	13 (11.7)	13 (10.7)	73 (9)
	Asian	0	2 (1.7)	2 (1.7)	2 (1.6)	1 (1)	4 (3.6)	1 (0.8)	12 (1.5)
	American Indian or Alaska Native	2 (1.7)	2 (1.7)	2 (1.7)	2 (1.6)	3 (2.9)	1 (0.9)	1 (0.8)	13 (1.6)
	Native Hawaiian or other Pacific Islander	0	1 (0.8)	1 (0.8)	1 (0.8)	1 (1)	1 (0.9)	0	5 (0.6)
	Hispanic or Latino	7 (6.1)	5 (4.2)	6 (5)	15 (12.3)	8 (7.8)	6 (5.4)	6 (5.0)	53 (6.5)
	Other, including multi-ethnic and/or multi-racial	0	3 (2.5)	2 (1.7)	3 (2.5)	1 (1)	3 (2.7)	6 (5.0)	18 (2.2)
Residency status N (%)	Year-round	111 (96.5)	116 (97.5)	114 (94.2)	119 (97.5)	101 (99)	109 (98.2)	118 (97.5)	788 (97.2)
	Seasonal	4 (3.5)	3 (2.5)	7 (5.8)	3 (2.5)	1 (1)	2 (1.8)	3 (2.5)	23 (2.8)
Children in home N (%)	Yes	31 (27)	35 (29.4)	27 (22.3)	34 (27.9)	36 (35.3)	22 (19.8)	32 (26.4)	217 (26.8)
Pet in home N (%)	Yes	81 (70.4)	91 (76.5)	79 (65.3)	90 (73.8)	78 (76.5)	73 (65.8)	84 (69.4)	576 (71)
Hunting N (%)	Yes	19 (16.5)	21 (17.6)	31 (25.7)	26 (21.3)	27 (26.4)	17 (15.3)	21 (17.3)	162 (20)
Fishing N (%)	Yes	68 (59.2)	71 (59.6)	73 (60.4)	75 (61.5)	68 (66.6)	50 (45)	66 (54.5)	471 (58.1)
Observing or studying wildlife N (%)	Yes	89 (77.4)	86 (72.2)	82 (67.8)	88 (72.1)	84 (82.4)	78 (70.3)	91 (75.2)	598 (73.7)
Filling bird feeders N (%)	Yes	60 (52.2)	55 (46.3)	64 (52.8)	63 (51.7)	54 (52.9)	47 (42.3)	62 (51.3)	405 (50)
Saw black bears in the wild N (%)	Yes	54 (47)	53 (44.5)	55 (45.5)	46 (37.7)	45 (44.1)	45 (40.5)	46 (38)	344 (42.4)
Enjoying hearing or seeing black bears in the wild N (%)	Yes	52 (45.2)	48 (40.3)	53 (43.8)	43 (35.2)	41 (40.2)	41 (36.9)	41 (33.9)	319 (39.3)
Negative interaction with black bears N (%)	Yes	3 (2.6)	7 (5.9)	9 (7.4)	8 (6.6)	6 (5.9)	2 (1.8)	5 (4.1)	40 (4.9)

Table E2. Means and standard deviations of behavioral intentions by experimental conditions (Family/Gain (FG), Community/Gain (CG), Family Loss (FL), Community Loss (CL), Bear Gain(BG), Bear Loss (BL) and Control), black bear food conditioning experiment.

	FG	CG	FL	CL	BG	BL	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Feeding black bears	98 2.19 2.09	112 2.15 2.05	116 2.11 1.98	91 2.21 2.04	114 2.36 2.11	99 2.12 1.88	101 2.02 1.86
Keep bird and wildlife feeders out of black bears' reach	92 **5.40**^{ag} 2.01	97 **4.73**^{bghijk} 2.25	95 **5.56**^{ch} 1.89	83 **5.67**^{di} 1.70	94 **5.44**^{ej} 1.94	83 **5.36**^{fk} 1.93	78 **3.92**^{abcdef} 2.42
Secure garbage and compost in bear-proof containers	95 **5.20**^{a} 2.11	108 **4.87**^{bgh} 2.25	110 **5.48**^{cg} 1.84	93 **5.76**^{dh} 1.56	108 **5.40**^{e} 1.89	94 **5.28**^{f} 1.98	88 **3.97**^{abcdef} 2.44
Pick up leftovers if feeding pets outdoors	57 5.44 2.11	77 5.40 2.01	71 5.51 1.90	62 5.69 1.77	62 5.47 2.05	56 5.93 1.66	62 4.82 2.47
Remove all pet food from your yard	56 **5.75**^{a} 1.73	79 **5.42**^{b} 1.90	75 **5.52**^{c} 1.77	65 **5.80**^{d} 1.78	64 **5.72**^{e} 1.89	57 **5.96**^{f} 1.48	63 **4.76**^{abcdef} 2.39
Report neighbors that are feeding black bears	97 **5.35**^{a} 2.12	107 **5.07**^{bgh} 2.08	106 **5.63**^{cg} 1.79	89 **5.43**^{d} 1.74	108 **5.62**^{eh} 1.67	98 **5.23**^{f} 2.08	85 **4.40**^{abcdef} 2.49
Ask neighbors to remove food that might attract black bears	95 **4.68**^{a} 2.10	109 **4.35**^{fg} 2.23	109 **4.90**^{b} 2.13	91 **5.05**^{cf} 1.91	109 **4.96**^{dg} 1.85	97 **4.88**^{e} 2.07	88 **3.81**^{abcde} 2.50
Ask neighbors to secure trash so that it is not available to black bears	93 **4.73**^{a} 2.11	108 **4.30**^{bghij} 2.18	107 **4.86**^{cg} 2.07	94 **5.17**^{dh} 1.81	111 **4.95**^{ei} 1.88	99 **4.88**^{fj} 2.10	93 **3.71**^{abcdef} 2.46
Seek out more information about black bears	107 **4.51**^{agj} 1.92	116 **4.38**^{bhi} 1.95	118 **4.89**^{ch} 2.02	100 **5.14**^{dgijkl} 1.66	119 **4.55**^{ek} 1.91	106 **4.59**^{fl} 1.87	106 **3.84**^{abcdef} 2.35
Avoid more information about black bears	107 2.60 1.96	114 2.92 2.09	116 2.58 2.04	101 2.67 2.01	116 2.78 2.11	108 2.69 1.87	99 2.69 2.01
Share information about black bears with other people	105 **4.90**^{a} 2.07	114 **4.85**^{b} 1.96	119 **5.24**^{c} 1.85	97 **5.36**^{d} 1.60	118 **5.16**^{e} 1.78	107 **5.08**^{f} 1.80	98 **3.87**^{abcdef} 2.32
Avoid going to places where black bears frequent	104 4.93 2.12	111 **4.41**^{bcd} 2.09	110 **5.13**^{b} 1.75	99 **5.01**^{c} 1.95	108 **5.18**^{ad} 1.90	105 4.73 2.17	103 **4.60**^{a} 2.21
Composite scale	77 **5.01**^{a} 1.72	92 **4.70**^{bgh} 1.78	89 **5.25**^{cg} 1.59	77 **5.46**^{dh} 1.34	86 **5.13**^{e} 1.56	77 **5.05**^{f} 1.70	73 **4.01**^{abcdef} 2.21

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f, g-g, h-h, i-i, j-j, k-k, l-l) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table E3. Behavioral intentions by experimental conditions (only includes behavioral intention items where all six message groups differed from the control condition), black bear food conditioning experiment.

		FG	CG	BG	FL	CL	BL	Control
		N=115	N=119	N=121	N=122	N=102	N=111	N=121
		%	%	%	%	%	%	%
Keep bird and wildlife feeders out of black bears' reach	Very Unlikely	8.7	15.1	5.0	7.4	6.9	6.3	21.5
	Moderately Unlikely	1.7	3.4	5.0	1.6	2.0	0.0	2.5
	Somewhat Unlikely	1.7	5.0	3.3	2.5	1.0	2.7	0.0
	Neither	6.1	6.7	9.1	9.0	7.8	13.5	13.2
	Somewhat Likely	13.0	10.9	12.4	8.2	10.8	6.3	5.8
	Moderately Likely	11.3	15.1	5.8	13.1	19.6	12.6	5.8
	Very Likely	37.4	26.1	35.5	34.4	32.4	33.3	15.7
	N/A	20.0	17.6	24.0	23.8	19.6	25.2	35.5
Secure garbage and compost in bear-proof containers	Very Unlikely	10.4	16.8	5.8	7.4	5.9	9.0	22.3
	Moderately Unlikely	2.6	1.7	5.0	1.6	1.0	0.0	4.1
	Somewhat Unlikely	2.6	3.4	5.8	3.3	3.9	3.6	3.3
	Neither	7.8	10.1	8.3	14.8	6.9	9.9	12.4
	Somewhat Likely	11.3	11.8	13.2	13.9	11.8	11.7	5.0
	Moderately Likely	12.2	13.4	14.0	9.8	26.5	15.3	5.8
	Very Likely	35.7	33.6	36.4	38.5	35.3	35.1	19.8
	N/A	17.4	9.2	11.6	10.7	8.8	15.3	27.3
Remove all pet food from your yard	Very Unlikely	4.9	6.6	6.3	5.7	5.3	1.4	16.7
	Moderately Unlikely	0.0	2.2	3.8	2.3	1.3	0.0	2.4
	Somewhat Unlikely	1.2	3.3	2.5	1.1	3.9	1.4	0.0
	Neither	2.5	9.9	7.6	12.5	6.6	9.7	10.7
	Somewhat Likely	11.1	13.2	5.1	13.6	7.9	6.9	9.5
	Moderately Likely	16.0	12.1	8.9	15.9	13.2	16.7	4.8
	Very Likely	33.3	39.6	45.6	29.5	43.4	43.1	31.0
	N/A	30.9	13.2	20.3	19.3	18.4	20.8	25.0

Table E3. (Continued).

		FG	CG	BG	FL	CL	BL	Control
		N=115	N=119	N=121	N=122	N=102	N=111	N=121
		%	%	%	%	%	%	%
Report neighbors that are feeding black bears	Very Unlikely	0.0	0.0	0.0	0.0	1.0	0.0	0.0
	Moderately Unlikely	11.3	10.9	4.1	5.7	6.9	9.9	19.0
	Somewhat Unlikely	1.7	2.5	3.3	1.6	1.0	3.6	2.5
	Neither	.9	5.9	2.5	4.1	3.9	.9	5.0
	Somewhat Likely	7.8	11.8	8.3	13.1	14.7	11.7	5.8
	Moderately Likely	7.8	10.1	14.9	5.7	10.8	10.8	5.0
	Very Likely	15.7	13.4	19.0	18.9	18.6	11.7	9.1
	N/A	39.1	35.3	36.4	37.7	30.4	39.6	24.0
Ask neighbors to secure trash so that it is not available to black bears	Very Unlikely	13.0	10.1	11.6	13.1	12.7	11.7	29.8
	Moderately Unlikely	1.7	18.5	8.3	12.3	10.8	12.6	29.8
	Somewhat Unlikely	4.3	6.7	4.1	4.1	0.0	.9	2.5
	Neither	11.3	3.4	9.1	5.7	4.9	5.4	.8
	Somewhat Likely	13.0	12.6	9.9	13.1	14.7	12.6	12.4
	Moderately Likely	14.8	17.6	19.8	10.7	13.7	12.6	5.8
	Very Likely	22.6	11.8	14.9	21.3	24.5	15.3	9.9
	N/A	19.1	20.2	24.0	19.7	22.5	29.7	15.7
Seek out more information about black bears	Very Unlikely	8.7	9.2	9.9	13.1	8.8	10.8	23.1
	Moderately Unlikely	8.7	13.4	9.1	12.3	6.9	9.0	27.3
	Somewhat Unlikely	6.1	6.7	12.4	4.9	2.9	5.4	5.8
	Neither	20.0	6.7	8.3	2.5	6.9	3.6	3.3
	Somewhat Likely	15.7	21.8	19.0	21.3	16.7	27.0	14.9
	Moderately Likely	14.8	15.1	10.7	13.1	16.7	15.3	7.4
	Very Likely	19.1	16.8	20.7	15.6	25.5	13.5	11.6
	N/A	7.0	16.8	18.2	26.2	21.6	21.6	17.4

Table E3. (Continued).

		FG	CG	BG	FL	CL	BL	Control
		N=115	N=119	N=121	N=122	N=102	N=111	N=121
		%	%	%	%	%	%	%
Share information about black bears with other people	Very Unlikely	11.3	10.9	7.4	7.4	7.8	7.2	24.0
	Moderately Unlikely	2.6	5.0	4.1	4.9	2.0	.9	3.3
	Somewhat Unlikely	7.8	3.4	7.4	3.3	1.0	4.5	6.6
	Neither	11.3	16.0	11.6	16.4	13.7	18.9	16.5
	Somewhat Likely	13.9	16.0	24.0	14.8	24.5	18.9	4.1
	Moderately Likely	13.9	19.3	15.7	20.5	21.6	15.3	9.1
	Very Likely	30.4	25.2	27.3	29.5	24.5	30.6	17.4
	N/A	8.7	4.2	2.5	3.3	4.9	3.6	19.0

Table E4. Means and standard deviations of emotional responses, by experimental conditions (Family/Gain (FG), Community/Gain (CG), Family Loss (FL), Community Loss (CL), Bear Gain (BG), Bear Loss (BL) and Control), black bear food conditioning experiment.

	FG	CG	FL	CL	BG	BL	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Afraid	115 **2.23**^{cd} 1.50	119 **2.23**^{ef} 1.35	122 **2.73**^{aceg} 1.65	102 **2.71**^{bdfh} 1.70	121 **2.31**^{gh} 1.67	111 2.47 1.47	121 **2.15**^{ab} 1.56
Angry	115 **2.18**^{efg} 1.56	119 **2.17**^{hijk} 1.46	122 **2.79**^{aeh} 1.82	102 **2.62**^{bi} 1.76	121 **2.69**^{cfj} 1.84	111 **2.67**^{dgk} 1.74	121 **2.04**^{abcd} 1.58
Sad	115 **2.52**^{efgh} 1.62	119 **2.70**^{ij} 1.73	122 **3.08**^{ael} 1.90	102 **3.04**^{bfm} 1.85	121 **3.36**^{cgik} 1.94	111 **3.85**^{dhjklm} 1.86	121 **2.26**^{abcd} 1.60
Guilty	115 1.93 1.41	119 2.11 1.39	122 2.21 1.58	102 2.34 1.66	121 2.20 1.59	111 2.07 1.48	121 1.93 1.44
Optimistic	115 **4.40**^{a} 1.84	119 **4.36**^{b} 1.71	122 **4.02**^{cf} 1.84	102 **4.02**^{dg} 1.69	121 **4.65**^{fgh} 1.57	111 **4.17**^{eh} 1.53	121 **4.99**^{abcde} 1.70

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f, g-g, h-h, i-i, j-j, k-k, l-l, m-m) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table E5. Perceived seriousness of threats bears pose to self and others, by experimental conditions (Family/Gain (FG), Community/Gain (CG), Family Loss (FL), Community Loss (CL), Bear Gain (BG), Bear Loss (BL) and Control), black bear food conditioning experiment.

Perceived threat …	FG	CG	FL	CL	BG	BL	Control
	N Mean[1] *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
to oneself	115 2.96 2.08	119 **2.86**^{ab} 1.96	122 **3.40**^{ac} 2.18	102 **3.45**^{bd} 2.06	121 2.95 1.98	111 **2.65**^{cd} 1.87	121 2.94 2.23
to one's family	115 2.94 2.13	119 2.84 1.94	122 3.44 2.17	102 3.43 1.95	121 3.02 2.07	111 2.79 1.94	121 3.06 2.24
to one's pets	81 **3.41**^{c} 1.90	91 **2.91**^{adef} 1.79	89 **3.65**^{d} 1.89	77 **4.06**^{ceg} 1.75	79 **3.49**^{f} 1.82	73 **3.18**^{bg} 1.80	84 **3.91**^{ab} 2.04
to other people in one's community	115 **2.96**^{cd} 1.97	119 **3.03**^{ef} 1.97	122 **3.69**^{acegi} 2.09	102 **3.82**^{bdfhj} 1.98	121 **3.06**^{gh} 1.95	111 **3.01**^{ij} 1.88	121 **3.12**^{ab} 2.20
to black bears if they frequent residential areas for food	115 **4.25**^{c} 2.06	119 **3.93**^{def} 2.06	122 **4.91**^{acdg} 2.00	102 **4.78**^{be} 1.93	121 **4.32**^{g} 2.08	111 **4.56**^{f} 2.20	121 **4.22**^{ab} 2.38
to other people's pets in your community posed by black bears	115 **3.24**^{cd} 2.06	119 **3.23**^{ef} 1.96	122 **3.84**^{aceh} 2.07	102 **3.89**^{bdfgi} 2.05	121 **3.33**^{g} 1.97	111 **3.23**^{hi} 1.95	121 **3.27**^{ab} 2.26
Composite scale	115 **3.27**^{cd} 1.79	119 **3.18**^{ef} 1.69	122 **3.86**^{acegi} 1.81	102 **3.87**^{bdfhj} 1.74	121 **3.34**^{gh} 1.74	111 **3.25**^{ij} 1.66	121 **3.32**^{ab} 2.06

[1]Mean of 7-point scale where 1=not at all serious and 7=extremely serious.

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f, g-g, h-h, i-i, j-j) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table E6. Perceived likelihood that a black bear will harm people or pets, by experimental conditions (Family/Gain (FG), Community/Gain (CG), Family Loss (FL), Community Loss (CL), Bear Gain (BG), Bear Loss (BL) and Control), black bear food conditioning experiment.

Perceived likelihood that a black bear …	FG	CG	FL	CL	BG	BL	Control
	N Mean[1] *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
will harm oneself	115 **2.54^{c}** 1.92	119 **2.28^{de}** 1.79	122 **2.99^{adf}** 2.06	102 **3.13^{bceg}** 1.98	121 2.72 1.93	111 **2.37^{fg}** 1.73	121 **2.44^{ab}** 2.00
will harm one's family	115 **2.45^{b}** 1.77	119 **2.27^{cde}** 1.70	122 **2.92^{cf}** 2.00	102 **3.12^{abdg}** 1.89	121 **2.78^{e}** 1.94	111 **2.41^{fg}** 1.73	121 **2.48^{a}** 1.92
will harm one's pets	81 3.11 1.78	91 **2.64^{ab}** 1.65	89 3.01 1.75	77 **3.45^{bc}** 1.74	79 3.05 1.68	73 **2.68^{c}** 1.57	84 **3.15^{a}** 1.79
will harm other people in one's community	115 **2.83^{c}** 1.82	119 **2.50^{def}** 1.72	122 **3.30^{ad}** 2.03	102 **3.45^{bceg}** 1.82	121 **3.12^{f}** 1.98	111 **2.87^{g}** 1.80	121 **2.65^{ab}** 1.94
will be harmed if it frequents residential areas	115 4.36 2.01	119 4.18 2.09	122 **4.69^{a}** 1.95	102 **4.56^{b}** 1.91	121 **4.55^{c}** 2.01	111 **4.70^{d}** 2.10	121 **3.88^{abcd}** 2.21
Will harm other people's pets in one's community	115 3.42 1.85	119 **3.03^{cd}** 1.83	122 **3.80^{ace}** 2.13	102 **3.91^{bdf}** 1.93	121 3.49 1.99	111 **3.24^{ef}** 1.88	121 **3.04^{ab}** 2.08
Composite Scale	115 **3.12^{d}** 1.59	119 **2.85^{efg}** 1.46	122 **3.54^{ae}** 1.77	102 **3.63^{bdfh}** 1.65	121 **3.33^{cg}** 1.70	111 **3.12^{h}** 1.49	121 **2.90^{abc}** 1.77

[1]Mean of 7-point scale where 1=very unlikely and 7=very likely.

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f, g-g) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table E7. Means and standard deviations of attitudes toward recommended behaviors, by experimental conditions (Family/Gain (FG), Community/Gain (CG), Family Loss (FL), Community Loss (CL), Bear Gain (BG), Bear Loss (BL) and Control), black bear food conditioning experiment.

	FG	CG	FL	CL	BG	BL	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Ineffective - Effective	115 6.23 1.30	119 6.15 1.34	122 6.13 1.42	102 6.24 1.24	121 6.18 1.36	111 6.22 1.35	121 6.18 1.20
Unwise - Wise	115 6.28 1.42	119 6.34 1.29	122 6.15 1.51	102 6.25 1.34	121 6.24 1.48	111 6.41 1.25	121 6.36 1.30
Worthless - Valuable	115 6.17 1.31	119 6.12 1.38	122 6.04 1.51	102 6.21 1.30	121 6.03 1.59	111 6.24 1.35	121 6.11 1.43
Useless - Useful	115 6.23 1.30	119 6.23 1.33	122 6.14 1.44	102 6.30 1.21	121 6.03 1.65	111 6.33 1.30	121 6.27 1.30

Table E8. Means and standard deviations of beliefs about black bears, by experimental conditions (Family/Gain (FG), Community/Gain (CG), Family Loss (FL), Community Loss (CL), Bear Gain (BG), Bear Loss (BL) and Control), black bear food conditioning experiment.

	FG	CG	FL	CL	BG	BL	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Timid	115 4.28 1.50	119 **4.51**[a] 1.58	122 **4.48**[b] 1.70	102 **4.55**[c] 1.62	121 **4.35**[d] 1.77	111 4.23 1.77	121 **3.91**[abcd] 1.58
Curious	115 5.79 1.25	119 5.81 1.05	122 5.85 1.13	102 5.72 1.29	121 5.69 1.22	111 5.78 1.37	121 5.87 1.26
Beautiful	115 5.81 1.37	119 5.86 1.30	122 5.87 1.25	102 5.90 1.23	121 5.78 1.43	111 5.71 1.34	121 5.60 1.29
Native	115 5.56 1.55	119 5.64 1.44	122 5.82 1.42	102 5.89 1.27	121 5.85 1.38	111 5.76 1.50	121 5.61 1.49
Nuisance	115 3.69 1.65	119 3.56 1.67	122 3.96 1.75	102 4.18 1.67	121 3.83 1.81	111 3.52 1.74	121 3.97 1.79
Bold	115 **4.61**[a] 1.61	119 **4.79**[b] 1.53	122 **4.87**[c] 1.60	102 **4.82**[d] 1.58	121 **4.92**[eg] 1.61	111 **4.49**[fg] 1.75	121 **5.38**[abcdef] 1.24
Intimidating	115 5.14 1.65	119 5.27 1.49	122 5.50 1.40	102 5.22 1.50	121 5.42 1.39	111 5.14 1.57	121 5.43 1.28

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f, g-g) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

APPENDIX F: ANCILLARY RESULTS TABLES, COYOTE/PET SAFETY EXPERIMENT

Table F1. Comparison of respondents' demographic characteristics, by experimental conditions (Individual/Gain (IG), Community/Gain (CG), Individual/Loss (IL), Community/Loss (CL), and Control), coyote/pet safety experiment.

		Coyote/pet safety experimental conditions					
		Individual Gain	Community Gain	Individual Loss	Community Loss	Control	Overall
Gender N (%)	Male	36 (37.9)	32 (37.6)	36 (39.1)	41 (45.1)	37 (38.9)	187 (39.7)
	Female	59 (62.1)	53 (62.4)	56 (60.9)	50 (54.9)	58 (61.1)	276 (60.3)
Age Mean (SD)		50.6 (16.8)	49.6 (16.1)	49.4 (16.8)	51 (15.5)	48.8 (16.4)	49.9 (16.3)
Education N (%)	Grade 8 or lower	0	0	0	0	0	0
	Some high school	0	0	3 (3.3)	5 (5.5)	2 (2.1)	10 (2.2)
	High school	17 (17.9)	13 (15.3)	15 (16.3)	17 (18.7)	7 (7.4)	69 (15.1)
	Some college	26 (27.4)	27 (31.8)	24 (26.1)	22 (24.2)	32 (33.7)	131 (28.6)
	Associate degree	12 (12.6)	9 (10.6)	16 (17.4)	10 (11)	11 (11.6)	58 (12.7)
	Bachelor's degree	25 (26.3)	22 (25.9)	26 (28.3)	20 (22)	26 (27.4)	119 (26)
	Master's degree	13 (13.7)	13 (15.3)	3 (3.3)	11 (12.1)	16 (16.8)	56 (12.2)
	Professional degree	0	1 (1.2)	4 (4.3)	4 (4.4)	0	9 (2)
	Doctorate degree	2 (2.1)	0	1 (1.1)	2 (2.2)	1 (1.1)	6 (1.3)
Household income in thousands (median)		50K-75K	50K-75K	50K-75K	50K-75K	50K-75K	50K-75K
Years of residence in Florida Mean (SD)		21.5 (14.3)	21.8 (15)	22.4 (16.5)	19.1 (15.5)	21.1 (15.1)	21.2 (15.3)

Table F1. (continued).

		Individual Gain	Community Gain	Individual Loss	Community Loss	Control	Overall
Race N (%)	White	78 (82.1)	72 (84.7)	70 (76.1)	76 (83.5)	72 (75.8)	368 (80.3)
	Black or African American	5 (5.3)	5 (5.9)	8 (8.7)	6 (6.6)	10 (10.5)	34 (7.4)
	Asian	1 (1.1)	1 (1.2)	1 (1.1)	1 (1.1)	2 (2.1)	6 (1.3)
	American Indian or Alaska Native	0	0	0	0	0	0
	Native Hawaiian or other Pacific Islander	0	0	0	0	0	0
	Hispanic or Latino	10 (10.5)	4 (4.7)	12 (13)	4 (4.4)	10 (10.5)	40 (8.7)
	Other, including multi-ethnic and/or multi-racial	1 (1.1)	2 (2.4)	1 (1.1)	3 (3.3)	1 (1.1)	8 (1.7)
Residency status N (%)	Year-round	93 (97.9)	79 (92.9)	88 (95.7)	84 (92.3)	93 (97.9)	437 (95.4)
	Seasonal	2 (2.1)	6 (7.1)	4 (4.3)	7 (7.7)	2 (2.1)	21 (4.6)
Children in home N (%)	Yes	9 (9.5)	19 (22.4)	19 (20.7)	19 (20.9)	27 (28.4)	93 (20.3)
Pet in home N (%)	Yes	77 (76.8)	58 (68.2)	67 (72.8)	66 (72.5)	65 (68.4)	329 (71.8)
Dog in home N (%)	Yes	54 (56.8)	43 (50.6)	47 (51.1)	52 (57.1)	49 (51.6)	245 (53.5)
Cat in home N (%)	Yes	39 (41)	33 (38.8)	31 (33.7)	34 (37.3)	38 (40)	175 (38.2)
Hunting N (%)	Yes	12 (12.6)	7 (8.3)	10 (10.9)	13 (14.3)	12 (12.7)	54 (11.8)
Fishing N (%)	Yes	43 (45.3)	45 (53)	44 (47.9)	48 (52.8)	55 (57.9)	235 (51.3)
Observing or studying wildlife N (%)	Yes	62 (65.3)	47 (55.3)	60 (65.2)	67 (73.6)	60 (73.7)	306 (66.8)
Filling bird feeders N (%)	Yes	45 (47.4)	41 (48.2)	49 (53.3)	38 (41.8)	53 (55.8)	226 (49.3)
Saw coyotes in the wild N (%)	Yes	34 (35.8)	27 (31.8)	37 (40.2)	34 (37.4)	35 (36.8)	167 (36.5)
Enjoying hearing or seeing coyotes in the wild N (%)	Yes	21 (22.1)	17 (20)	25 (27.2)	23 (25.3)	24 (25.3)	110 (24)
Negative interaction with coyotes N (%)	Yes	3 (3.2)	2 (2.4)	2 (2.2)	1 (1.1)	2 (2.1)	10 (2.2)

Table F2. Means and standard deviations of behavioral intentions, by experimental conditions (Individual/Gain (IG), Community/Gain (CG), Individual/Loss (IL), Community/Loss (CL), and Control), coyote/pet safety experiment.

	Individual Gain	Community Gain	Individual Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Keep pets under control when outside	68 6.13 1.33	53 6.09 1.62	60 6.35 1.31	63 6.16 1.44	61 5.89 1.79
Walk dogs on leashes	53 6.43 1.39	42 6.00 1.85	47 6.26 1.50	51 6.57 0.94	48 6.40 1.32
Keep cats indoors	39 6.00 1.78	32 6.16 1.67	28 6.43 1.14	30 5.83 1.72	35 5.71 1.82
Prevent pets from roaming freely outside	70 6.03 1.72	54 5.67 2.05	62 5.98 1.66	65 5.62 1.95	62 5.42 2.02
Stay attentive to small children when outside	76 6.09 1.53	68 5.65 1.94	73 6.11 1.58	74 5.82 1.83	81 5.72 1.82
Tell other people to supervise their pets when outside	88 **5.69**^{acd} 1.57	79 **4.65**^{ce} 2.26	87 **5.57**^{be} 1.76	88 **5.00**^{d} 1.89	91 **4.49**^{ab} 2.16
Seek out more information about coyotes	89 **4.39**^{ae} 2.01	79 **3.71**^{be} 2.15	83 **3.94**^{c} 2.07	88 **3.82**^{d} 2.07	84 **2.98**^{abcd} 2.13
Avoid more information about coyotes	88 2.60 1.83	75 2.12 1.72	81 2.35 1.87	86 2.52 1.64	82 2.67 1.89
Share information about coyotes with other people	88 **5.19**^{ae} 1.76	79 **4.56**^{bef} 2.26	82 **5.22**^{cf} 1.91	88 **4.75**^{d} 2.04	83 **3.33**^{abcd} 2.07

Table F2. (continued).

	Individual Gain	Community Gain	Individual Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Avoid going to places where coyotes frequent	87 4.75 2.29	75 4.17 2.36	82 4.48 2.25	86 4.72 2.23	79 4.13 2.47
Kill coyotes	80 **2.21**[acd] 1.89	79 **1.61**[ce] 1.34	72 **2.19**[bef] 1.88	82 **1.62**[df] 1.49	81 **1.46**[ab] 1.12
Hire a trapper to catch coyotes	73 2.41 1.79	76 2.17 1.93	76 1.99 1.54	82 1.93 1.76	81 1.79 1.46
Remove coyotes	72 2.54 1.94	75 2.35 1.93	76 2.55 1.95	77 2.19 1.94	78 1.95 1.48
Composite Scale	52 **5.78**[a] 1.05	42 5.37 1.23	43 **5.79**[b] 1.03	47 **5.49**[c] 1.07	48 **5.03**[abc] 1.05

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table F3. Behavioral intentions by experimental conditions (only includes behavioral intention items where all four message groups differed from the control condition), coyote/pet safety experiment.

		Coyote food Conditioning message conditions				
		IG	CG	IL	CL	Control
		N=95	N=86	N=93	N=91	N=95
		%	%	%	%	%
Seek out more information about coyotes	Very Unlikely	13.7	25.6	18.3	22.0	38.9
	Moderately Unlikely	7.4	8.1	8.6	6.6	5.3
	Somewhat Unlikely	4.2	3.5	6.5	11.0	8.4
	Neither	23.2	18.6	20.4	20.9	13.7
	Somewhat Likely	10.5	15.1	14.0	15.4	7.4
	Moderately Likely	17.9	10.5	8.6	5.5	6.3
	Very Likely	16.8	11.6	14.0	15.4	8.4
	N/A	6.3	7.0	9.7	3.3	11.6
Share information about coyotes with other people	Very Unlikely	5.3	16.3	9.7	13.2	29.5
	Moderately Unlikely	4.2	9.3	0.0	3.3	7.4
	Somewhat Unlikely	4.2	1.2	2.2	5.5	3.2
	Neither	15.8	14.0	16.1	19.8	24.2
	Somewhat Likely	15.8	10.5	12.9	12.1	7.4
	Moderately Likely	18.9	16.3	16.1	16.5	7.4
	Very Likely	28.4	25.6	32.3	26.4	8.4
	N/A	7.4	7.0	10.8	3.3	12.6

Table F4. Means and standard deviations of emotional responses, by experimental conditions (Individual/Gain (IG), Community/Gain (CG), Individual/Loss (IL), Community/Loss (CL), and Control), coyote/pet safety experiment.

	Individual Gain	Community Gain	Individual Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Afraid	95 **3.08**[ad] 1.93	85 **2.93**[b] 1.91	92 **3.17**[ce] 1.82	91 **2.44**[de] 1.60	95 **2.09**[abc] 1.54
Angry	95 **2.46**[ad] 1.65	85 **2.31**[e] 1.53	92 **3.28**[bdef] 1.97	91 **2.44**[cf] 1.61	95 **1.93**[abc] 1.51
Sad	95 **3.55**[ae] 2.09	85 **3.31**[bf] 1.88	92 **4.68**[cefg] 1.89	91 **3.53**[dg] 1.80	95 **2.26**[abcd] 1.59
Guilty	95 1.86 1.23	85 1.78 1.27	92 2.02 1.38	91 1.80 1.20	95 1.73 1.33
Optimistic	95 **3.96**[a] 2.03	85 **3.68**[b] 1.88	92 **3.53**[c] 1.94	91 **3.47**[d] 1.97	95 **4.59**[abcd] 1.84

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f, g-g) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table F5. Means and standard deviations of perceived risk severity and susceptibility, by experimental conditions (Individual/Gain (IG), Community/Gain (CG), Individual/Loss (IL), Community/Loss (CL), and Control), coyote/pet safety experiment.

	Individual Gain	Community Gain	Individual Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
How serious is the threat to your pets posed by coyotes?	73 2.99 1.95	58 3.40 2.13	67 3.00 2.01	66 2.56 1.96	65 2.74 1.99
How serious is the threat to other people's pets posed by coyotes?	95 **4.60[a]** 1.82	85 **4.51[b]** 1.79	92 **4.68[c]** 1.90	91 **4.51[d]** 1.93	95 **3.56[abcd]** 1.98
My pets will be harmed by coyotes.	73 2.26 1.70	58 2.16 1.53	67 2.34 1.70	66 1.91 1.70	65 2.18 1.57
Other people's pets will be harmed by coyotes in the county where I live.	95 **4.00[a]** 1.91	85 **3.69[b]** 1.91	92 **4.15[c]** 1.90	91 **3.78[d]** 2.14	95 **2.97[abcd]** 1.95

*Note: Rows with the same letter (a-a, b-b, c-c, d-d) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table F6. Means and standard deviations of attitudes toward recommended behaviors, by experimental conditions (Individual/Gain (IG), Community/Gain (CG), Individual/Loss (IL), Community/Loss (CL), and Control), coyote/pet safety experiment.

	Individual Gain	Community Gain	Individual Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Ineffective - Effective	95 6.59 1.04	85 6.14 1.49	92 6.29 1.42	91 6.25 1.30	95 6.07 1.42
Unwise - Wise	95 6.54 1.11	85 6.22 1.42	92 6.20 1.48	91 6.33 1.32	95 6.21 1.24
Worthless - Valuable	95 6.44 1.19	85 6.07 1.59	92 6.14 1.49	91 6.08 1.54	95 6.03 1.39
Useless - Useful	95 6.55 1.00	85 6.07 1.54	92 6.10 1.72	91 6.19 1.48	95 6.02 1.35
How would you describe your overall attitude toward keeping cats indoors to protect them from coyotes?	95 6.15 1.26	85 5.86 1.46	92 6.04 1.35	91 6.04 1.42	95 5.61 1.63

Table F7. Means and standard deviations of beliefs about coyotes, by experimental conditions (Individual/Gain (IG), Community/Gain (CG), Individual/Loss (IL), Community/Loss (CL), and Control), coyote/pet safety experiment.

	Individual Gain	Community Gain	Individual Loss	Community Loss	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Timid	95 3.36 1.87	85 2.85 1.55	92 3.41 1.63	91 3.16 1.64	95 3.34 1.56
Aggressive	95 5.24 1.71	85 5.14 1.67	92 5.14 1.56	91 5.26 1.44	95 5.19 1.49
Beautiful	95 4.40 1.81	85 4.55 1.67	92 4.76 1.49	91 4.63 1.63	95 4.55 1.69
Common	95 **4.58[a]** 1.57	85 **4.26[b]** 1.68	92 **4.42[c]** 1.50	91 **4.31[d]** 1.62	95 **3.78[abcd]** 1.74
Nuisance	95 4.71 1.77	85 4.47 1.76	92 4.57 1.70	91 4.44 1.87	95 4.43 1.61
Bold	95 5.17 1.56	85 5.32 1.42	92 5.32 1.55	91 5.16 1.53	95 5.17 1.42
Intimidating	95 5.32 1.52	85 5.15 1.58	92 5.12 1.55	91 4.99 1.60	95 5.20 1.46

*Note: Rows with the same letter (a-a, b-b, c-c, d-d) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

APPENDIX G: ANCILLARY RESULTS TABLES, LIONFISH EXPERIMENT

Table G1. Comparison of respondents' demographic characteristics, by experimental conditions (Ecology/General (E1G), Ecology/Specific (E1S), Economy/General (E2G), Economy/Specific (E2S) and Control), lionfish experiment.

		E1G	E1S	E2G	E2S	Control	Overall
Gender N (%)	Male	64 (40.8)	52 (32.5)	60 (35.9)	51 (31.1)	66 (42.3)	293 (36.4)
	Female	93 (59.2)	108 (67.5)	107 (64.1)	113 (68.9)	90 (57.7)	511 (63.6)
Age Mean (SD)		46.7 (17.1)	49.8 (18)	49.5 (17.4)	47.8 (18)	47.7 (17.6)	48.3 (17.6)
Education N (%)	Grade 8 or lower	0	0	1(0.6)	0	0	1 (0.1)
	Some high school	4 (2.5)	3 (1.9)	4 (2.4)	3 (1.8)	2 (1.3)	16 (2)
	High school	30 (19.1)	41 (25.6)	34 (20.4)	30 (18.3)	22 (14.1)	157 (19.5)
	Some college	39 (24.8)	49 (30.6)	50 (29.9)	52 (31.7)	46 (29.5)	236 (29.4)
	Associate degree	23 (14.6)	16 (10.0)	26 (15.6)	13 (7.9)	19 (12.2)	97 (12.1)
	Bachelor's degree	45 (28.7)	30 (18.8)	28 (16.8)	37 (22.6)	46 (29.5)	186 (23.1)
	Master's degree	13 (8.3)	17 (10.6)	18 (10.8)	21 (12.8)	19 (12.2)	88 (10.9)
	Professional degree	2 (1.3)	3 (1.9)	4 (2.4)	7 (4.3)	0	16 (2.0)
	Doctorate degree	1(0.6)	1 (0.6)	2(1.2)	1 (0.6)	2 (1.3)	7 (0.9)
Household income in thousands (median)		35K-50K	35K-50K	35K-50K	35K-50K	35K-50K	35K-50K
Years of Florida residence Mean (SD)		20.8 (15.9)	23 (14.3)	24.7(15.1)	21.7 (17.1)	22.3 (14.6)	22.5 (15.5)

Table G1. (continued).

		E1G	E1S	E2G	E2S	Control	Overall
Race N (%)	White	124 (79)	124 (77.5)	129 (77.2)	126 (76.8)	112 (71.8)	615 (76.5)
	Black or African American	11 (7.0)	11 (6.9)	14 (8.4)	18 (11)	15 (9.6)	69 (8.6)
	Asian	2(1.3)	3 (1.9)	3 (1.8)	4 (2.4)	6 (3.8)	18 (2.2)
	American Indian or Alaska Native	1 (0.6)	1 (0.6)	0	0	0	2 (0.2)
	Native Hawaiian or other Pacific Islander	0	1 (0.6)	0	0	1 (0.6)	2 (0.2)
	Hispanic or Latino	17 (10.8)	15 (9.4)	13 (7.8)	12 (7.3)	18 (11.5)	75 (9.3)
	Other, including multi-ethnic and/or multi-racial	2(1.3)	4 (2.5)	5 (3)	3 (1.8)	4 (2.6)	18 (2.2)
Residency status N (%)	Year-round	150 (95.5)	158 (98.8)	161 (96.4)	157 (95.7)	154 (98.7)	780 (97)
	Seasonal	7 (4.5)	2 (1.3)	6 (3.6)	7 (4.3)	2 (1.3)	24 (3)
Hunting N (%)	Yes	25 (15.9)	25 (15.7)	21 (12.6)	15 (9.1)	22 (14.1)	108 (13.4)
Fishing N (%)	Yes	83 (52.8)	79 (49.4)	75 (44.9)	77 (47)	87 (55.8)	402 (49.9)
Observing or studying wildlife N (%)	Yes	100 (63.7)	107 (66.9)	90 (53.9)	98 (59.7)	103 (66)	498 (61.9)
Filling bird feeders N (%)	Yes	67 (42.7)	65 (40.6)	69 (41.4)	74 (45.1)	79 (50.6)	354 (44)
Scuba diving N (%)	Yes	35 (22.3)	29 (18.2)	23 (13.8)	26 (15.8)	30 (19.2)	143 (17.8)
Spearfishing N (%)	Yes	20 (12.8)	18 (11.3)	12 (7.2)	15 (9.1)	25 (16.1)	90 (11.2)
Saw lionfish in the wild N (%)	Yes	17 (10.8)	17 (10.6)	11 (6.6)	16 (9.8)	13 (8.3)	74 (9.2)

Table G2. Means and standard deviations of behavioral intentions related to lionfish invasion, by experimental conditions (Ecology/General (E1G), Ecology/Specific (E1S), Economy/General (E2G), Economy/Specific (E2S) and Control), lionfish experiment.

	Ecology General	Ecology Specific	Economy General	Economy Specific	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Seek out more information about lionfish	157 **4.59**[a] 1.89	160 **4.46**[b] 1.91	167 **4.59**[c] 1.87	164 **4.47**[d] 1.94	156 **3.69**[abcd] 2.21
Avoid more information about lionfish	157 2.38 1.66	160 2.44 1.66	167 2.31 1.62	164 2.49 1.72	156 2.81 1.86
Share information about lionfish with other people	157 **4.85**[a] 1.94	160 **4.84**[b] 1.81	167 **5.05**[c] 1.71	164 **4.82**[d] 1.97	156 **3.47**[abcd] 2.11
Donate to organizations whose mission is to address the lionfish issue	157 **3.87**[a] 1.86	160 **3.73**[b] 1.94	167 **3.77**[c] 1.83	164 **3.71**[d] 1.88	156 **2.80**[abcd] 1.79
Eat lionfish	157 2.39 1.79	160 2.42 1.92	167 2.40 1.84	164 2.48 1.91	156 1.98 1.66
Support legislation that helps to address the lionfish issue	157 **5.05**[a] 1.84	160 **4.89**[b] 1.87	167 **4.97**[c] 1.82	164 **4.98**[d] 1.92	156 **3.81**[abcd] 2.06
Composite	157 **4.59**[a] 1.63	160 **4.48**[b] 1.62	167 **4.60**[c] 1.52	164 **4.50**[d] 1.61	156 **3.44**[abcd] 1.82

*Note: Rows with the same letter (a-a, b-b, c-c, d-d) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table G3. Behavioral intentions related lionfish removal, by experimental conditions (only includes behavioral intention items where all four message groups differed from the control condition).

		Lionfish behavioral intentions message conditions				
		Ecology General	Ecology Specific	Economy General	Economy Specific	Control
		N=160	N=162	N=167	N=164	N=157
		%	%	%	%	%
Seek out more information about lionfish	Very Unlikely	13.8	11.7	10.2	14.0	31.8
	Moderately Unlikely	5.0	7.4	6.6	4.9	5.7
	Somewhat Unlikely	7.5	13.0	8.4	6.7	4.5
	Neither	15.0	13.0	18.0	20.1	15.3
	Somewhat Likely	21.9	21.0	20.4	20.7	15.9
	Moderately Likely	21.3	17.9	18.6	15.9	15.9
	Very Likely	15.6	16.0	18.0	17.7	10.8
Share information about lionfish with other people	Very Unlikely	46.9	45.1	50.3	43.9	41.4
	Moderately Unlikely	4.4	3.7	4.2	3.7	9.0
	Somewhat Unlikely	5.6	8.0	4.2	5.5	7.7
	Neither	13.8	10.5	15.6	16.0	16.0
	Somewhat Likely	17.5	22.8	24.6	20.2	15.4
	Moderately Likely	22.5	28.4	21.6	15.3	10.9
	Very Likely	23.1	16.0	23.4	27.0	9.6

Table G3. (Continued).

		Lionfish behavioral intentions message conditions				
		Ecology General	Ecology Specific	Economy General	Economy Specific	Control
		N=160	N=162	N=167	N=164	N=157
		%	%	%	%	%
Donate to organizations whose mission is to address the lionfish issue	Very Unlikely	20.6	21.6	18.6	21.3	40.8
	Moderately Unlikely	8.1	9.3	9.6	7.9	7.6
	Somewhat Unlikely	7.5	11.1	9.0	9.8	8.9
	Neither	23.8	21.0	28.1	24.4	25.5
	Somewhat Likely	18.8	15.4	13.8	20.7	10.2
	Moderately Likely	15.6	13.0	15.6	7.3	3.8
	Very Likely	5.6	8.6	5.4	8.5	3.2
Support legislation that helps to address the lionfish issue	Very Unlikely	54.4	55.6	54.5	51.2	67.5
	Moderately Unlikely	3.1	4.9	4.8	2.4	6.4
	Somewhat Unlikely	3.1	4.9	4.8	3.7	5.7
	Neither	15.0	13.0	18.0	17.1	22.9
	Somewhat Likely	19.4	22.8	21.0	15.2	18.5
	Moderately Likely	23.1	21.6	17.4	23.8	7.6
	Very Likely	25.0	22.2	26.3	26.2	13.4

Table G4. Means and standard deviations of emotional responses, by experimental conditions (Ecology/General (E1G), Ecology/Specific (E1S), Economy/General (E2G), Economy/Specific (E2S) and Control), lionfish experiment.

	Ecology General	Ecology Specific	Economy General	Economy Specific	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Anxious	157 **3.54**[a] 1.74	160 **3.45**[b] 1.72	167 **3.31**[c] 1.75	164 **3.43**[d] 1.75	156 **2.68**[abcd] 1.72
Angry	157 **3.63**[a] 1.85	160 **3.61**[b] 1.86	167 **3.50**[c] 1.82	164 **3.72**[d] 1.87	156 **1.86**[abcd] 1.46
Sad	157 **4.07**[a] 1.92	160 **4.30**[b] 1.83	167 **3.89**[c] 1.85	164 **4.17**[d] 1.88	156 **2.08**[abcd] 1.53
Optimistic	157 **3.77**[a] 1.80	160 **3.73**[b] 1.67	167 **3.77**[c] 1.63	164 **3.53**[d] 1.74	156 **4.99**[abcd] 1.76

*Note: Rows with the same letter (a-a, b-b, c-c, d-d) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table G5. Means and standard deviations of perceived risk severity, by experimental conditions (Ecology/General (E1G), Ecology/Specific (E1S), Economy/General (E2G), Economy/Specific (E2S) and Control), lionfish experiment.

	Ecology General	Ecology Specific	Economy General	Economy Specific	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
How serious is the threat to Florida's marine ecology posed by lionfish?	157 **5.40**[a] 1.72	160 **5.44**[b] 1.62	167 **5.26**[c] 1.73	164 **5.60**[d] 1.58	156 **4.35**[abcd] 1.89
How serious is the threat to Florida's economy posed by lionfish?	157 **4.79**[a] 1.68	160 **4.83**[b] 1.76	167 **4.87**[c] 1.76	164 **5.08**[d] 1.75	156 **3.84**[abcd] 1.84
How serious is the threat to Floridians posed by lionfish?	157 **4.38**[a] 1.91	160 **4.41**[b] 1.81	167 **4.47**[c] 1.71	164 **4.55**[d] 1.70	156 **3.66**[abcd] 1.82
How serious is the threat to you personally posed by lionfish?	157 **3.48**[a] 1.73	160 **3.32**[b] 1.84	167 **3.30**[c] 1.72	164 3.18 1.80	156 **2.88**[abc] 1.75
Composite Scale	157 **4.51**[a] 1.51	160 **4.50**[b] 1.46	167 **4.48**[c] 1.48	164 **4.60**[d] 1.37	156 **3.68**[abcd] 1.56

*Note: Rows with the same letter (a-a, b-b, c-c, d-d) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table G6. Means and standard deviations of perceived risk susceptibility, by experimental conditions (Ecology/General (E1G), Ecology/Specific (E1S), Economy/General (E2G), Economy/Specific (E2S) and Control), lionfish experiment.

	Ecology General	Ecology Specific	Economy General	Economy Specific	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
What is the likelihood that Florida's marine ecology will be harmed by lionfish?	157 **5.32[a]** 1.71	160 **5.35[b]** 1.77	167 **5.30[c]** 1.63	164 **5.53[d]** 1.63	156 **4.35[abcd]** 1.92
What is the likelihood that Florida's economy will be harmed by lionfish?	157 **4.52[ae]** 1.77	160 **4.63[bf]** 1.92	167 **4.83[c]** 1.70	164 **5.09[def]** 1.80	156 **3.78[abcd]** 1.87
What is the likelihood that Floridians will be harmed by lionfish?	157 **3.85[d]** 1.77	160 **4.06[a]** 1.93	167 **4.16[b]** 1.83	164 **4.36[cd]** 1.89	156 **3.45[abc]** 1.81
What is the likelihood that you will be harmed by lionfish?	157 2.91 1.75	160 **3.02[a]** 1.85	167 **3.13[b]** 1.78	164 **2.97[c]** 1.72	156 **2.58[abc]** 1.64
Composite Scale	157 **4.51[ae]** 1.51	160 **4.50[b]** 1.46	167 **4.48[c]** 1.48	164 **4.60[de]** 1.37	156 **3.68[abcd]** 1.56

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table G7. Means and standard deviations of attitudes toward addressing the lionfish issue, by experimental conditions (Ecology/General (E1G), Ecology/Specific (E1S), Economy/General (E2G), Economy/Specific (E2S) and Control), lionfish experiment.

	Ecology General	Ecology Specific	Economy General	Economy Specific	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Unimportant - Important	157 **5.51**[a] 1.69	160 **5.46**[b] 1.61	167 **5.35**[c] 1.78	164 **5.54**[d] 1.84	156 **4.76**[abcd] 1.85
Unnecessary - Necessary	157 **5.49**[a] 1.75	160 **5.36**[b] 1.70	167 **5.45**[c] 1.76	164 **5.49**[d] 1.83	156 **4.86**[abcd] 1.79
Poor use of time and money – Good use of time and money	157 **5.20**[a] 1.63	160 **5.11**[b] 1.62	167 **5.17**[c] 1.73	164 **5.20**[d] 1.85	156 **4.67**[abcd] 1.80
Composite Scale	157 **5.40**[a] 1.53	160 **5.31**[b] 1.54	167 **5.33**[c] 1.65	164 **5.41**[d] 1.72	156 **4.76**[abcd] 1.71

*Note: Rows with the same letter (a-a, b-b, c-c, d-d) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table G8. Means and standard deviations of beliefs about lionfish, by experimental conditions (Ecology/General (E1G), Ecology/Specific (E1S), Economy/General (E2G), Economy/Specific (E2S) and Control), lionfish experiment.

	Ecology General	Ecology Specific	Economy General	Economy Specific	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Invasive	157 **5.59**[a] 1.74	160 **5.70**[b] 1.53	167 **5.62**[c] 1.55	164 **5.92**[d] 1.44	156 **5.17**[abcd] 1.63
Predatory	157 5.47 1.60	160 **5.76**[ac] 1.40	167 **5.29**[cd] 1.48	164 **5.63**[bd] 1.46	156 **5.28**[ab] 1.51
Venomous	157 **4.19**[ae] 1.88	160 **4.54**[b] 1.69	167 **4.52**[c] 1.76	164 **4.74**[de] 1.82	156 **5.13**[abcd] 1.57
Common	157 **4.18**[ab] 1.70	160 **4.71**[ac] 1.47	167 **4.18**[cd] 1.46	164 **4.70**[bd] 1.64	156 4.42 1.46
Nuisance	157 5.38 1.66	160 **5.66**[a] 1.48	167 **5.43**[b] 1.53	164 **5.60**[c] 1.60	156 **5.06**[abc] 1.52
Bold	157 5.16 1.59	160 5.21 1.41	167 4.92 1.52	164 5.28 1.51	156 5.06 1.53
Intimidating	157 **4.59**[ab] 1.77	160 **5.09**[ac] 1.48	167 **4.60**[cd] 1.60	164 **4.96**[bd] 1.70	156 4.87 1.55
Reproducing rapidly	157 **5.26**[c] 1.65	160 **5.54**[ad] 1.32	167 **5.16**[de] 1.59	164 **5.71**[bce] 1.42	156 **5.01**[ab] 1.37
Dangerous	157 5.04 1.72	160 5.33 1.46	167 5.02 1.61	164 5.27 1.62	156 5.10 1.58
Eating large amounts of other fish	157 **5.62**[ad] 1.53	160 **5.64**[be] 1.45	167 **5.23**[de] 1.49	164 **5.41**[c] 1.54	156 **4.98**[abc] 1.42
Beautiful	157 **4.23**[a] 1.76	160 **4.08**[bd] 1.69	167 **4.29**[c] 1.68	164 **4.48**[d] 1.74	156 **4.69**[abc] 1.60

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table G9. Means and standard deviations of issue salience, by experimental conditions (Ecology/General (E1G), Ecology/Specific (E1S), Economy/General (E2G), Economy/Specific (E2S) and Control), lionfish experiment.

	Ecology General	Ecology Specific	Economy General	Economy Specific	Control
To me, the lionfish issue is…	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Important	157 **5.63[a]** 1.45	160 **5.61[b]** 1.45	167 **5.60[c]** 1.54	164 **5.67[d]** 1.46	156 **4.62[abcd]** 1.79
Relevant	157 **5.43[a]** 1.67	160 5.09 1.88	167 5.26 1.80	164 **5.48[b]** 1.87	156 **4.87[ab]** 1.83
Of interest	157 **5.32[a]** 1.41	160 **5.39[b]** 1.47	167 **5.37[c]** 1.56	164 **5.37[d]** 1.66	156 **4.53[abcd]** 1.82

*Note: Rows with the same letter (a-a, b-b, c-c, d-d) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table G10. Means and standard deviations of perceived responsibility, by experimental conditions (Ecology/General (E1G), Ecology/Specific (E1S), Economy/General (E2G), Economy/Specific (E2S) and Control), lionfish experiment.

	Ecology General	Ecology Specific	Economy General	Economy Specific	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Florida Fish and Wildlife Conservation Commission (FWC)	157 **5.69[a]** 1.57	160 **5.80[b]** 1.44	167 5.59 1.59	164 **5.88[c]** 1.45	156 **5.27[abc]** 1.66
Non-governmental organizations and groups	157 **4.98[a]** 1.65	160 **5.02[b]** 1.54	167 4.73 1.57	164 **4.98[c]** 1.53	156 **4.53[abc]** 1.63
Commercial fishermen	157 **5.12[a]** 1.69	160 **5.13[b]** 1.45	167 **5.10[c]** 1.71	164 **5.39[d]** 1.58	156 **4.72[abcd]** 1.67
Divers	157 **4.91[a]** 1.67	160 **4.83[b]** 1.57	167 **4.75[c]** 1.68	164 **4.71[d]** 1.78	156 **4.33[abcd]** 1.79
Citizens	157 4.44 1.72	160 4.44 1.66	167 4.35 1.77	164 4.57 1.61	156 4.05 1.82

*Note: Rows with the same letter (a-a, b-b, c-c, d-d) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.

Table G11. Concern for people, marine life, and the economy, by experimental conditions (Ecology/General (E1G), Ecology/Specific (E1S), Economy/General (E2G), Economy/Specific (E2S) and Control), lionfish experiment.

	Ecology General	Ecology Specific	Economy General	Economy Specific	Control
	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*	N Mean *SD*
Worried about marine ecosystems	157 **5.25**[a] 1.68	160 **5.51**[b] 1.59	167 **5.22**[c] 1.66	164 **5.48**[d] 1.55	156 **4.67**[abcd] 2.02
Worried about fairy basslets	157 **3.75**[b] 1.76	160 **4.87**[abcd] 1.77	167 **3.66**[c] 1.85	164 **3.73**[d] 1.81	156 **3.87**[a] 1.87
Worried about Florida's economy	157 **4.72**[a] 1.89	160 **4.73**[b] 1.80	167 **4.94**[c] 1.70	164 **5.10**[d] 1.72	156 **4.21**[abcd] 1.96
Worried about lobster fishermen	157 **4.44**[bc] 1.86	160 **4.49**[de] 1.87	167 **3.98**[bdf] 1.73	164 **5.39**[acef] 1.59	156 **4.15**[a] 1.83
Concerned about marine ecosystems	157 **5.32**[a] 1.76	160 **5.51**[b] 1.59	167 **5.23**[c] 1.71	164 **5.56**[d] 1.61	156 **4.67**[abcd] 1.95
Concerned about fairy basslets	157 **3.88**[b] 1.77	160 **5.16**[abcd] 1.65	167 **3.72**[c] 1.91	164 **3.90**[d] 1.96	156 **3.97**[a] 1.87
Concerned about Florida's economy	157 **4.71**[d] 1.87	160 **4.86**[a] 1.77	167 **4.92**[b] 1.74	164 **5.20**[cd] 1.70	156 **4.33**[abc] 1.95
Concerned about lobster fishermen	157 **4.51**[bc] 1.87	160 **4.63**[de] 1.82	167 **4.00**[bdf] 1.74	164 **5.31**[acef] 1.73	156 **4.24**[a] 1.84
Composite Scale	157 **4.57**[cd] 1.48	160 **4.97**[ace] 1.46	167 **4.46**[ef] 1.42	164 **4.96**[bdf] 1.33	156 **4.26**[ab] 1.70

*Note: Rows with the same letter (a-a, b-b, c-c, d-d, e-e, f-f) are significantly different at $p < 0.05$, based on results of one-way ANOVAs.